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TECHNOLOGY & SCIENCE

IN CASE OF
EMERGENCY

CONSIDERING the wide range of emergency situations which could arise during flight, it may seem facetious to suggest that we *plan for emergencies* because the subject is as complex as flying itself. Almost every aspect of aviation operations could become pertinent to that period of time between the recognition that an emergency situation exists and the final moment of truth – when the worst effects of the emergency have been realized.

The complexity of today's aircraft aggravates the problem. Many aircraft incorporate four, five or more systems each of which may be more complex and more costly than an entire aircraft of yesteryear. Because of this, it may take a pilot years before he acquires the education, training and experience necessary to have a complete understanding of all aspects of his modern, high performance aircraft. This *does* pose a problem – because aircraft emergencies have no respect for any person.

A good knowledge of emergency procedures will go far to fill the gaps in a young pilot's experience but it is not possible to establish rigid procedures for the handling of every emergency. Nevertheless, one big advantage of having established procedures is that they enable us to *prethink* certain situations. For example, in certain critical inflight emergencies there may not be enough time to think the matter through from scratch; therefore, a previous consideration of the action to be taken under the given set of circumstances may mean the difference between success or failure in coping with the emergency. Moreover, a system of standardized procedures (NATOPS) enables us to distill (and make available to novice and pro alike) the benefits of a vast amount of hard-won operational experience.

In spite of the advantages of knowing and practicing emergency procedures until they become second nature, we should not be misled into believing that this is the complete answer to every emergency. On the contrary, we should recognize that most emergencies will require judgment on the part of the pilot – either at the outset or subsequently – which can only be based on complete understanding of the aircraft and its systems. This means that in addition to knowing procedures, we should strive to learn as much as we can about the operation of our aircraft and its systems. This may well mean going beyond the handbook in pursuit of knowledge. The same thing may be said of the need to be knowledgeable of flying rules and regulations and other operational considerations. Just how far a pilot should be expected to go in pursuit of

Emergency procedures, studied and practiced until they are second nature, are the only answer to some emergencies.

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knowledge is a moot question. He may be able to satisfy the ops officer, the training officer and the C.O., by completing the NAMO training, the physiological checkouts, the NATOPS written tests and the prescribed syllabus – and still not know enough. In the final analysis, how much the pilot ought to know is limited only by the pilot's interest, application and professional pride.

As a practical matter, accident reports received at NavSafeCen too often indicate that the pilot involved did not possess the necessary understanding of procedures and/or his aircraft to adequately cope with the emergency. It is, therefore, refreshing to read a report such as the following:

> "The plane commander's post emergency analysis of the possible extent of collateral damage in the port wheel well, his prompt marshalling of assistance during the return flight and his foresight in planning for the contingencies prior to his approach and landing are fine examples of the professional approach to naval aviation."

The phrase, "... his prompt marshalling of assistance ..." in the quoted report brings up another consideration in the handling of emergencies.

The Team Effort

Regardless of how well versed a pilot may be in the operation of his aircraft or his knowledge of procedures, we ought to recognize that emergencies have occurred and will continue to occur where even the most knowledgeable pilot can benefit from communication with – and assistance from – personnel on the ground. There are often operations and maintenance specialists available upon relatively short notice who are able to fill in gaps in a pilot's knowledge or to help analyze a situation which may have become confused under the stresses of an emergency. For this reason, if you have an emergency and time permits, let someone know.

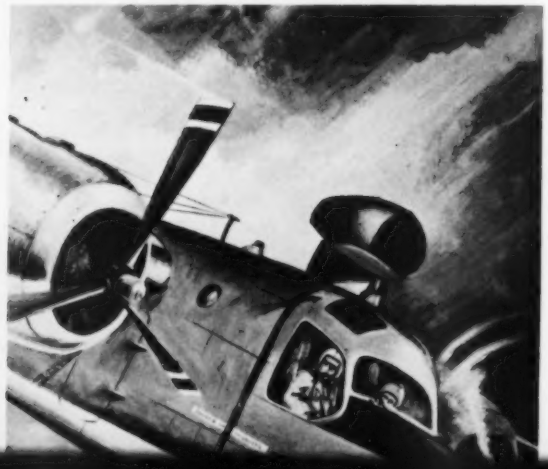
The propensity of a few pilots to keep their problems to themselves is illustrated by the case of the pilot who inadvertently flew his helicopter into the water (but effected a recovery) during the return from a night rescue mission. The following excerpt from the subsequent AAR explains:

> "Even though the pilot had lost his port main gear and extensively damaged his starboard main gear upon collision with the water, he did not declare an emergency to GCA, the air station

The crew of this aircraft recognized their fuel situation as being marginal while still 135 miles from their destination. They kept this information to themselves, however, and did not declare an emergency until two minutes before both engines flamed out. Both pilots ejected successfully and the aircraft crashed 1-1/2 miles from the approach end of the destination runway. The aircraft accident board noted that had they notified the Center of their predicament (when they first recognized their fuel was marginal), they could have been directed to a suitable landing field only 35 miles away.

tower or to the heliport tower until after he had entered a hover at the heliport and discovered that he was unable to contact his base radio."

In other words, once this pilot recovered from the immediate effects of this emergency, he adopted sort of a *business as usual* attitude. Self-reliance is a quality much to be admired in the naval aviator but this is going a bit far. In this case the advantages of declaring an emergency and alerting ground personnel are fairly obvious, i.e., additional firefighting equipment, crash/rescue facilities and medical personnel standing by to assist. Of course, a pilot might still be able to call for and get such assistance after talking things over in routine fashion with squadron personnel but in too many cases there will be no time for such a laizzez-faire approach to the situation because aircraft are time-limited and much of the assistance available from the ground is time-consuming.



It takes time to spread a blanket of foam, time to reset certain emergency gear, time to calculate a DF steer, time to get an experienced pilot up to the tower, time to allow other aircraft to rendezvous to lead you back or look you over and time to clear conflicting traffic. If you delay in letting someone know your problem, you may not be able to afford this time.

A Timely Declaration

The matter of priority over other traffic has sometimes been implicated in a pilot's failure to make a timely declaration of an emergency, i.e., the feeling on the part of the pilot that unless it is a severe (unquestionable) emergency it's better not to declare it for to do otherwise may cause involvement in the redtape of justifying oneself to the FAA or other authorities after the situation has been resolved. Is there a valid reason for reluctance on the part of a pilot in declaring an emergency? The answer, of course, is no. If you have an emergency, declare it. It is true that a report or reports might be required, although it should be noted that they are no longer automatically required; rather, they are made only upon request of the FAA.

There have been far too many cases where pilots never did declare an emergency – right up to the time of a tragic accident resulting from forseen or forseeable circumstances. This seems to be a regularly recurring phenomena in those cases of fuel exhaustion which are the result of either poor planning or the result of an outright attempt to stretch range at the expense of minimum required fuel reserves. Although we believe the basic answer to this particular problem is better flight

". . . . find the pilot (in this accident) culpable in that he did not use his equipment – failed to use the ADF, failed to use emergency IFF, failed to use Guard frequency, failed to call it a full-blown emergency early enough and failed to go to assigned headings, thereby confusing the picture."

– from an AAR endorsement

planning and a stricter appreciation of rules and regulations – we also believe that anyone who finds himself in a situation where he knows or suspects that he has insufficient or marginal fuel is well-advised to declare an emergency forthwith. It may be that he will have some explaining to do after he gets on the ground and such explanations may be difficult but it will be far easier to make an explanation for declaring an emergency than it will be to explain the loss of an aircraft and/or lives. The same may be said of any other type of emergency regardless of how it came about. To do otherwise (fail to declare an emergency when appropriate) can only compound the initial error.

To sum up, emergencies in flight do occur from time to time. When this happens the pilot is often called upon to respond in an immediate and effective manner in order to avert disaster. His ability to react quickly and correctly in these circumstances will be enhanced by an expert knowledge of emergency procedures which have been practiced until they can be executed with precision. Moreover, the adequacy of his overall response may well depend upon an in-depth understanding of his aircraft and its systems – and measured judgment.

Finally, even the most experienced and knowledgeable pilot can often benefit from advice and assistance from outside sources, either on the ground or in the air; therefore, when an emergency arises, let someone know. Use the period of time available between the onset of the emergency and its final resolution in such a manner that the maximum knowledge, experience and judgment is brought to bear on the problem.

". . . . When the utility failure was discovered, the pilots recognized the problem and took appropriate action. It is significant that the pilot alerted the tower immediately of his utility failure, his intention to make an arrested landing and his desire for a crash crew 'set up.' Had he waited or believed the emergency was not 'serious enough' as many pilots are wont to do, circumstances may not have been as favorable as they were. With such a delay and with less fuel available, it is conceivable that the runway could not have been foamed in time. In the absence of this lubricant, damage would likely have been greater and fire might have ensued."

– from the AAR

Pro-Am

By LCDR A. W. Stoeckel
ASO VS-29

THE Bing Crosby Pro-Am; The Andy Williams Pro-Am; it seems like everybody's sponsoring a Pro-Am nowdays. Pro-Am, of course, is the increasingly popular type of golf tournament which pairs leading professional golfers with outstanding amateur partners.

These amateurs are well known names in their own fields and often command bigger galleries than the pros themselves. Nonetheless, whether the setting is the craggy, cypress-dotted links of Del Monte Forest, the lofty, treacherous Torry Pines or the searing, dusty Desert Inn, this conglomeration of celebrity studded names is known as the amateur half of the Pro-Am. The point of discussion here is to determine just how wide that hyphen is which separates Pro-Am. Is it a matter of physical ability? Is it mental? Emotional? A matter of personal choice and pride? Pros play better? Pros play for pay – amateurs play for fun? Maybe it's none of these things and maybe it's all of them. So as a newcomer to the galleries how does one pick out the Pros from the Ams? What is the real difference?

A spectator cannot readily distinguish the two groups by appearance. Costumes are generally the same, colorful slacks and sweaters – impeccably polished shoes – turtle-neck shirts – huge, gaping golf bags with umbrella handles sticking out – floppy head covers dangling from shiny woods. Moreover, Pros and Ams alike come in an assortment of heights, weights and sizes, so stature is not an indication. Even the golfer's swing is not a reliable clue. So where is the dividing line? Can it be given a concrete dimension? It might be simply stated that the dimension is found in the term itself – *PROFESSIONAL*. But even that concept lacks precise definition – or does it?

Let's analyze the meaning of professional and amateur by following a twosome – Joe Proe and Sam Amm as they arrive at Monterey, California, for the annual Crosby clambake.

Joe Proe and Sam Amm are long-time acquaintances and are playing as a team in the celebrated "Crosby." Sam arranged to get away for a few days and is ecstatic about playing in the tournament and being a part of the glamour and general merry-making associated with the tournament. Sam arrives Monday and checks in at the Del Monte Lodge cause "that's where it happens, Baby," bordered on all sides by golf courses and cocktail parties. Sam expects to get acquainted Monday night and Tuesday, and probably "hit a few" Wednesday – then the beginning of the four-day tournament on Thursday. He quickly changes out of his business suit and into the casual attire of the afternoon cocktail crowd; and with the visions of how he's going to carry No. 16 at Cypress Point dancing in his head – he advances on the bar.

Joe Proe also arrives early Monday afternoon, decides on the Mark Thomas Inn – a little less hectic than the Lodge and more conducive to an early secure. He takes care of the administrative details required by the committee, registering for both himself and his playing partner, Sam. Next he checks his schedule, noting his practice times and the order in which he will play the three Crosby courses. Later in the day Joe meets with his assigned caddy to discuss procedures and schedules and to check his equipment and clothing. Tuesday he plays practice rounds at Spyglass Hill and Cypress Point, noting distances of all shots, possible trouble areas,

alternate lines of approach to greens, the general condition of tees, fairways, traps, roughs and greens and discusses strategy with his caddy. Sam calls Tuesday evening, says he's raring to go – gonna' kill 'em – come on out for a drink, and how about a few pointers on the practice tee tomorrow? Joe says, "Good to hear from you, Sam, take a rain-check on that drink and OK, see you by the tennis courts at Pebble Beach tomorrow afternoon."

Wednesday morning Joe Proe hits a hundred shots to warm up, plays Pebble Beach, logging all vital information and returns to the practice tee to hit middle irons. Joe's caddy notes that Joe is slightly higher and shorter than normal with his middle irons. A good point to remember.

Sam charges up in a golf cart in company with a friend and a martini. Sorry he's late – "Gad what a party last night – how you hittin' 'em Joe?"

"OK."

"Say, want you to meet an old friend of mine – gonna go around with us on Thursday. Say, Joe, I'm gonna have to postpone our practice session today. There's a little group getting together this afternoon down at the Lodge – and the old swing's in the groove anyhow – don't want to screw it up – right, Joe?"

"Sam, with your sweet swing I wouldn't practice either."

"OK, Joe, see you later – hey, where do we play tomorrow?"

"Spyglass."

"What time?"

"8:05."

"Damn, that's early. You know what they did with my sticks?"

"At the caddy shack."

"Who's my caddy?"

"133, Silva, here's his phone number."

"Hey, by the way, are we all signed up?"

"Right, Sam, all set."

"OK, Joe, say how about taking that raincheck on that drink tonight?"

"Wish I could, Sam, we meet with the rules committee tonight – lot of local stuff."

"OK, Joe, see you tomorrow – gonna kill 'em, hey?"

"Right, Sam."

Thursday at 8:05 at Spyglass Hill two golfers looking very smart in their tournament best wait their turn on the tree lined, dog-leg par 5 at Spyglass. One golfer notices the size of the gallery looking for that *well-wisher* who promised to go around with him; waits to hear his name announced by the starter and visualizes that boomer he's going to rip.

The other golfer notices a subtle breeze kicking up – notices the deep cut of the tee, the morning dew still on the grass, ponders the probable landing area of his drive, the angle and distance on his second and third shots and thinks, "Maybe a two-wood instead of the driver."

Both men swing well. Both hit what appear to be good drives and both stride jauntily down the fairway. But, only one is the professional. One has prepared and maintained himself in the highest degree of physical and mental readiness. One has labored relentlessly to master the physical requirements of his trade and to improve his own dexterity. One has observed, carefully, every facet of the environment in which he is going to perform and has preplanned what recovery action would be necessary in the event that unexpected circumstances arise. One has meticulously checked the tools of his trade ensuring that his equipment would give him the best opportunity for success. One has realized the importance of the people who will support him and does his best to evoke and utilize their expert assistance. And all this before he ever strapped in. Once his round begins, bolstered by a confidence which comes from total readiness, he is prepared to meet the challenge head on and to weigh analytically and respond professionally to all events which might affect his mission.

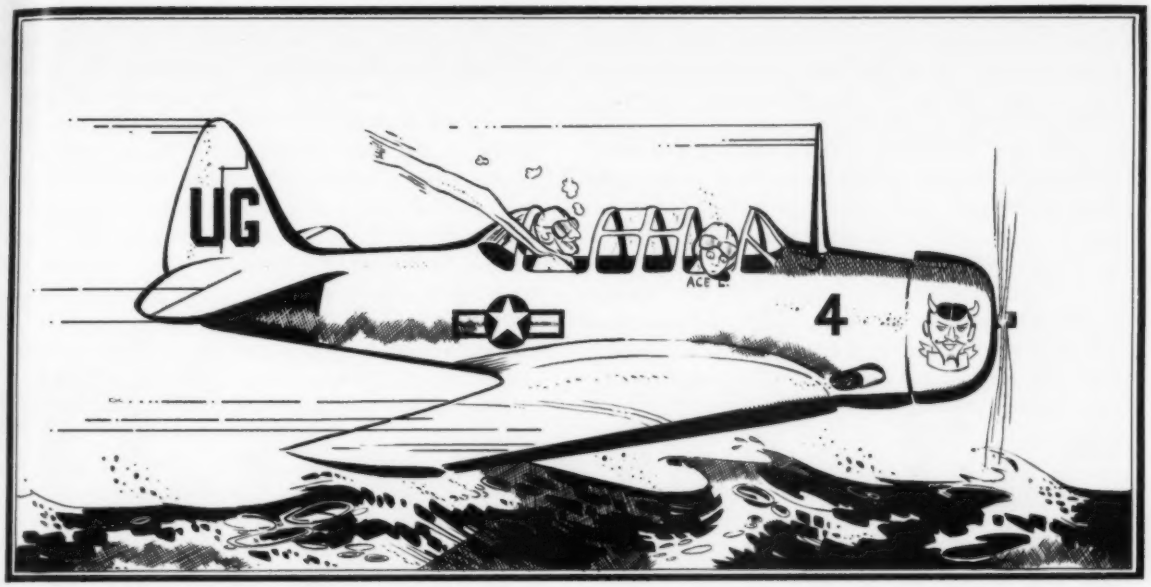
A golfer aspiring to the title *Professional* will do well to reflect on Joe Proe and Sam Amm.

So will a Naval Aviator!

REFLECTIONS

REFLECTIONS

I OFTEN think back on the early years of my flying career and marvel at the fact that I'm still in one piece. There is something about the airplane that makes some of us a bit of a showman – even though we can't act. Many of these acts are out of date and have faded from the scene much the way vaudeville has disappeared from the theater. They were pre-NATOPS so to speak and, owing to the vigorous application of our NATOPS program, will probably not appear in quantity again. However, I wonder if we are giving due consideration to the occasional performance which gets its review in the AAR.



Some of my own experiences tend to convince me that it generally requires about six to eight years for the naval aviator to reach full stature as an experienced performer in the eyes of less experienced pilots. Yet, it is these same "old pros" that often perform such thoughtless feats of skill and derring – do as unauthorized air combat maneuvering, the high speed break, the impromptu low level sightseeing tour and the ever popular VFR flight under IFR conditions. "Ivory tower shotgunning" you may suspect. Hardly. NATOPS notwithstanding, scenes like the following, culled from my experience, in the dim dark past still enjoy far too much popularity.

Once upon a time Henry and I were burning up the sky around Puget Sound, chasing clouds and practicing instruments in our trusty SNJ. I was in the front seat enjoying the struggle going on under the hood in the back. Eventually, Henry would admit defeat and beg out from under the bag. I didn't have long to wait as a tired voice said, "I think I've had the course." I smiled that "I told-you-so smile," as I told Henry to "Pop the hood." Now, in the Training Command that phrase meant something I had long forgotten. The instructor was telling the student to come out from under the hood and see, "where you are." It usually meant that the instructor would take the controls permitting the student to relax and light up if he cared to. It wasn't until we were in a 60-degree dive, 500 ft above the water and passing through 180 kts that I chanced to glance into the rear cockpit and observe Henry calmly lighting up. Bracing myself on the glare shield with one hand I grabbed the mike and, in a voice clearly motivated with pure panic, asked, "What the hell are you trying to do, scare me?" Cigarette in his mouth, match in one hand and stick in the other, Henry artfully maneuvered the *Jaybird* to an inverted position about 50 ft above the water, then rolled it upright and lit up his weed. After exchanging thoughts on the preceeding 5 minutes we decided that there had been a misunderstanding about the meaning of "pop the hood" and that no one had been flying the plane! Following several unsuccessful attempts at a landing I managed to salvage one of the most spectacular drop-ins on record and, when we were securely in the chocks, we made a bee-line for the package store and secured to our room in the "Q" to meditate on our sins.

Henry was always busy when I suggested we grab a *Jay* and hit it again. Pete wasn't. One afternoon, after a wet snowfall, Pete and I were cruising along the bluffs near a snake ranch occupied by some of our comrades.

Continued

As we dipped a wing in salute to our fellow bird-men we observed a snowball fight in full bloom smack on the edge of the bluff. Who could resist a second look? As we arced around the bay for that second look I eased the mixture to lean to conserve fuel and focused on the snowball fight. The troops saw us coming. They called a truce and bombarded us with snowballs as we screamed by at eyeball level. Pulling back smartly on the stick we boomed up to 600 ft before the engine coughed and darned near quit due to the lean mixture.

As Francoise Sagan says in *Bonjour Tristesse*, "I pause to reflect." Nearly getting caught by the "I thought you had it game," and then a brief bluff buzz, dodging snowballs, suggests that's par for the course and it makes me shudder to think of what could have happened. Unfortunately, this kind of thing is still going on and shows too little evidence of becoming extinct. Someone, somewhere in the vast world of naval aviation, is going to attempt a little buzz job sometime soon and there will be an empty seat in the wardroom that night. Someone is going to hear the words, "Watch your six," in his headset and shortly afterward there will be an aluminum shower in the west 40.

The object of my reflections is to get you reflecting too. First of all each one of us probably has had at least one experience we could have done without. It comes to light at happy hour or when old buddies get together and swap sea stories. There is always the hope that if we put our past follies to work for us we can prevent someone else's in the future.

Experience is commonly called the best teacher and despite parochial concepts to the contrary this is still true. Therefore, if we take time to review our past performance we may be able to anticipate someone else's efforts to shorten his career and by so doing contribute much more to naval aviation than a good sea story.

Most fledging naval aviators will get their first taste of freedom in their first fleet squadron. Prior to this first fleet tour they have been under the watchful eyes of the primary, basic, advanced and RCVW instructors. Certainly they will still be closely observed but eventually they will get out on their own and that urge to flex one's wings is mighty hard to control. It's all part of the maturing process and turning a pilot loose to try it on his own is basic to the whole process of educating him. Had he not demonstrated certain fundamental characteristics up to this point he might very well be selling insurance instead of flying.

What we need to do is to ensure that our younger and lesser experienced aviators don't repeat the follies of the past; leadership and good example are the tools to prevent this.

One means of setting a good example is to assign an experienced buddy to the nugget to show him the way, not only in the air but on the ground as well. Encourage readyroom discussions and raise questions at APMs that have come up in the readyroom. Sincere interest in an aviator's performance will result in a greater identification with his unit and will develop a desire to be part of the team and less of a solo performer. The chance of extra-curricular activities is reduced by passing on reminders of the failures of the few who refused to listen to counsel. Each of us is a safety officer in his own right, it's not the ASO who watches our altitude or decides when the odds are against getting back in when the weather is bad.

Reflecting once in a while is worth the time. Each of us can contribute a little bit of safety philosophy to someone in need of it. That someone may be a junior pilot in your squadron who is looking for advice but hesitates to ask for it for fear of sounding like a dunce. Give the next fellow the benefit of your experience and perhaps he won't have to make the mistakes you did.

No one can rest his aviation future on past laurels. Professionalism in the operation of aircraft requires constant attention to detail and preparation for any eventuality.

He gave up his options one by one until he was committed; he had no choice but to cross the

LINE OF Thunderstorms

By Anymouse

I AROSE early and looked out the window. I should have saved myself the effort. The fog was so thick I could barely see the street lamp in the parking lot below. It looked like no flying this morning – at least for a few hours.

The morning routine progressed without incident and now I sat in the readyroom in the midst of an all pilots meeting which was being held by virtue of the fog which had made it impossible to carry out the early morning flight schedule.

This APM was a little different, though, because by force of circumstance I had become a central figure in the proceedings. As a matter of fact I had just taken my seat after recounting the details of a flight which I had made the preceding night. I had felt it necessary to report the details to the squadron because of having declared an emergency during the course of the flight. Now the other pilots, the ASO and the C.O. were all engaged in a discussion about the flight. The pros and cons were flying back and forth – mostly about the weather considerations – and I lapsed into a mental review of *the flight,* which I had just recounted. My thoughts returned to the time on the previous night when I had planned the flight. I remembered how I had been in the flight planning room at Pitterson AFB. I had stopped at a glass-topped table and looked through the glass to the pigeon-holes below and briefly studied the several stacks of SIDs. After a moment I had selected one labeled "Jet Departure No. 1" for closer scrutiny. Satisfied that it would be the one to best establish me on the route of my intended flight, I took a DD-175 from the nearby rack and proceeded to fill in the blocks.

I was preparing for the return flight from Pitterson AFB to NAS Gulf Coast. I had landed only an hour or so earlier to deliver a passenger to the base where he was scheduled to participate in a conference. Now I was planning my return trip which would be solo and at night. I was relatively unconcerned about the flight, however, as we had just flown the same route and had landed barely an hour earlier. We *had* encountered some weather on the earlier flight. There had been local thunderstorms in the vicinity of NAS Gulf Coast at the time of takeoff, however, by making use of radar vectors

furnished by the local RATCC we had been able to take off and climb in instrument conditions to on top without encountering any appreciable turbulence. Thereafter we had been able to stay clear of the considerable number of "isolated" thunderstorms by visually flying around them (with Center approval). There was one time during the flight, though, when things had been a little sticky; there was a massive thunderstorm astride our flight path with the top apparently reaching to 45,000 ft, or higher. Furthermore, at FL 390 we were barely above a stratus cloud layer which also seemed to be getting higher as we approached the thunderstorm. It stretched ahead of us and as far as we could see in any direction, right or left. Nevertheless, it appeared that we could stay above the stratus cloud layer and still circumnavigate the storm visually by climbing a little higher, say to FL 410. Notifying my passenger of this intention I requested and received ATC clearance to climb to FL 410 and clearance to deviate from the route of flight in order to go around the storm.

Turning 30 degrees to the right, I aimed for a point which would take the aircraft clear of the storm. By this time we were at FL 410 and just skimming the top of the cirrostratus layer. The surprising thing now was the time it was taking to get around the storm. It had appeared that the storm was only five miles or so in front of us but after flying along for four or five minutes we still were not abreast of it. It was apparent that the storm had been much further away than we had estimated. It also became painfully apparent that circumnavigating the storm was going to add considerable mileage to the planned route of flight – maybe as much as 50 additional miles. It would also take more fuel, which we could ill afford. The flight was such that the enroute distance approached the maximum no wind IFR range of the aircraft. It wasn't planned that way but the flight had turned out to be pretty much of a no-wind, max-range proposition since an expected 20-kt tailwind component had failed to materialize. The consideration of all these factors put me on edge to the extent that I began to wonder if our destination (some 300 miles away) still had the good weather which was forecast for our arrival. If not, I decided we'd better start considering the possibility of heading for a closer field. After being cleared to the Metro frequency I was somewhat relieved when the forecaster assured me that not only was our destination clear of clouds, with good visibility, but that we should outrun the stratus layer and be in the clear shortly.

The blaring sound of the operations loudspeaker interrupted my thoughts. I couldn't make out what they were saying but it sounded very much like I was being paged. I checked with the operations duty officer and was directed to the transient maintenance office across the room. Upon checking with them I was informed that my aircraft had not yet been fueled, because for some reason it would not accept a full load. Did I know any reason for this? Well, yes, now that they mentioned it I did; I had forgotten to put the tip tank transfer ON/OFF switch to ON after purging the tiptanks just prior to landing. After discussing the matter with the line chief I was informed that there would be a delay of about 45 minutes before they could get the aircraft fueled.

I didn't like the idea of a delay too much; I had been planning on getting back to NAS Gulf Coast in time to have a couple of hours on the town. On the other hand the delay might not be too bad at that. The forecaster had told me earlier in the day that the thunderstorms which had been building all afternoon should begin to dissipate about night fall. It was just getting dark now so the hour's delay might work to my benefit if it meant better weather.

I returned to the flight planning section, completed the DD-175 and then moved over to the forecaster's desk. The forecaster studied the flight plan and allowed as how things didn't look too good; the afternoon thunderstorms weren't beginning to dissipate as early as the NAS Gulf Coast forecaster had thought. In fact there were thunderstorm warnings out for the entire area from Kansas to Pennsylvania on the north and from Texas to the East Coast of Florida on the south, effective until midnight. For the most part they were still calling them isolated but there was a line of thunderstorms oriented NW/SE from Little Rock to Charleston. It didn't look too good even if the line of thunderstorms and associated weather was only about 100 miles across.

Was there a WW (severe weather warning) out? I almost hoped that there was because the decision to go or not to go would be simplified. If there was a WW out I'd just spend the night and return early the next morning. In that case, I knew my squadron would lose the aircraft for the first launch but that didn't worry me too much because it would be obvious to one and all

that the matter had been pretty much out of my hands – settled as it were by the WW.

But . . . . . there was no WW and I had a decision to make. After further discussion with the forecaster I determined that the tops of the thunderstorms were generally 30 to 35 thousand with an occasional one topping 45 thousand. Moreover, it appeared that I would have little to worry about as far as imbedded storms because the stratus layer topped out at less than 40 thousand and, most important, did not become a solid layer until a point along the south edge of the NW/SE line of thunderstorms. Destination weather was encouraging, too, as it was reporting 10,000 ft overcast and 7 miles with no thunderstorms present or forecast within 75 miles.

The winds at altitude? Well, it looked like it was going to be the same as before – essentially no wind. A max range effort again but it looked like I would be able to top everything important enroute and have good weather at my destination, so . . . .

Still, there was one thing that concerned me – that solid line of thunderstorms. There was a military airfield with an 8000 ft runway (Nash AFB) directly along my flight path and just north of the reported line of thunderstorms. I knew that I would have to have some place to go if for any reason my single-engine aircraft was not performing perfectly when I reached that line of thunderstorms. Not only that but I knew I would have to be right on the money as far as fuel because the alternate airfields beyond the line of thunderstorms figured to be almost as far away as my destination. So when I reached that line of thunderstorms, I knew in my mind that I would also be approaching sort of a point of no-return.

Dismissing these thoughts from my mind, I decided to go.

The forecaster completed the weather briefing form, continuing to discuss it with me as he did so. Departure weather? The forecaster led me to a nearby radar console. There were several build-ups just south of the field and along the departure route. Two of them straddled my route but the tops were estimated to be less than 25 thousand with light to moderate turbulence in the cells. I acknowledged this fact and taking the DD-175, I scribbled in the remarks section: "Request radar-monitored climb."

After depositing the DD-175 with the duty officer I preflighted and manned my aircraft securing the rear seat as I did so. My clearance came through shortly and I gave the lineman the signal to get me started. Taxi and takeoff were routine. So was the first part of the climb and shortly after contacting the Center I inquired if their radar showed any precipitation or heavy build-ups along the route. They advised me that there were several areas of apparent precipitation in the general area but that my present heading would keep me clear of the worst. Remembering the radar picture I had seen on the ground I acknowledged this information with some relief.

Leveling off at my cruising altitude of FL 410 I was in the clear although I could see isolated build-ups here and there. I could also see the lights of several cities far below. Things were looking good so I tuned the ARN-6 and sat back to enjoy the music and the scenery.

The scenery soon became more interesting. I was well in the clear but I could see numerous, well-defined thunderstorm cells in all quadrants. And even more interesting, they would light up at random like so many huge, elongated Japanese lanterns. The lightning seemed to be deep inside the cells and the outside of the clouds glowed softly in the night. I was impressed with the beauty of the scene I was witnessing.

"Beautiful," I thought, "but dangerous, too." I idly wondered what it would be like to penetrate one like that one over there whose top exceeded my cruising altitude. Not that I really wanted to find out. Yet, I *wondered.* During the five years since getting my wings I had been in some pretty bad weather and in turbulence so bad that I could hardly read the instrument panel. But on these occasions I had been in solid clouds and never had had an overall birds-eye view of the size and extent of the particular weather I was in at the moment. Of course, I had never penetrated one of those monsters like that one over there – knowingly – and if I had done so at all it had been at a much lower altitude.

The build-ups became much more numerous. I mentally noted that I'd be approaching that solid line of thunderstorms in only a few minutes. I remembered, too, that it was my point of no return for this flight. I decided to go to Metro frequency for some weather.

After receiving clearance from the Center I switched frequencies and gave Nash Metro a call and asked about the weather at Nash AFB. The answer was not good. There were thunderstorms in all quadrants in the vicinity of the field and while the ceiling was estimated to be 3000 ft overcast, visibility was down to 2 miles in rain. This brought me up short because I was now forced to remember a fact about this particular field which I had chosen to ignore up until this time, namely that the main runway was asphalt and had a reputation for poor braking action when wet – and I was flying an aircraft with one of the worst reputations for wet-runway braking characteristics. I did not relish the thought of penetrating God knows what kind of weather only to touchdown on a wet runway at night under these conditions. In a way, though, this information relieved me. It meant less trouble in deciding to push on to my

I'd be approaching that solid line of thunderstorms in only a few minutes.

destination. That was now about my only alternative anyway because I couldn't turn around and return to my point of takeoff. I mean really, I couldn't do that. Could I? I decided I couldn't so I gave Metro another call to see if I could further pin down the extent of the weather in front of me. Well, more bad news! It seems the "line of thunderstorms" had now become a generalized mass of thunderstorms in a 1000-mile long line oriented NW/SE and, worse yet, effectively denying me the use of all airfields along my flight path for the next 250 to 300 miles. The band extended, in fact, to within 50 or 60 miles of my destination. I gave Metro a PIREP, thanked them and returned to Center frequency, now determined to push on to my destination – but with a tinge of apprehension.

I soon noticed the edge of a stratus layer below me. At first it was thin and wispy but it soon became more solid. Fifty miles more and I was in the tops of the stratus layer. The many surrounding thunderstorms became increasingly difficult to see as the stratus lowered visibility at my flight level. I could still see lightning from the thunderstorms here and there but now it was a generalized glow in front or to the right or left of me – not the well-defined glow of a Japanese lantern as before. I decided I'd better climb. I called and requested FL 430. I was cleared as requested. I gave my fuel a close check, added power and began a slow climb. So slow in fact that I was barely able to stay above the stratus layer whose top seemed to be rising with me. Reaching FL 430 it was apparent that I'd soon be back in the clouds. I called for FL 440 and was cleared to operate at any altitude above FL 390. I continued to climb until leveling at FL 460. At last it seemed that I could remain in the clear.

I now began a close check of my aircraft's operation. I was at 95% – barely under max continuous power. And the EGT was pegged just short of max continuous, too. This was higher than I'd ever had this bird before. I was reassured by the fact that cabin pressurization was holding on schedule. I checked my airspeed. I was indicating about 175 kts. I mentally noted I was only 40 kts or so above a stall – and that any loss of airspeed would put me on the backside of the power curve and probably would ultimately result in a stall or a loss of altitude. I also noted I was indicating .70 mach and that the first effects of compressibility would start to be felt at about .72 or .73 at this altitude. I thought to myself: "No sweat as long as everything goes exactly right." The fact is, though, I was beginning to grab the seat pad, ever so slightly.

Another 100 miles and the slight grab became a firm grip when I unavoidably entered the stratus layer at FL 460. I called the Center and gave them my situation, requesting them to vector me to keep me clear of the build-ups. The controller sounded sympathetic but he informed me that he was unable to oblige since his radar did not define the build-ups that well. While we were talking he informed me that he could no longer paint my transponder squawk. In an effort to be helpful, he reiterated that I was cleared to operate at any altitude above FL 390 and added that I was cleared to deviate up to 100 miles to either side of course. He didn't say so but he may as well had added – "You're on your own."

On my own meant heading toward the darkest part of the sky, steering away from the areas which lit up from time to time with a generalized glow. I knew all I had to do was get into turbulence sufficient to affect my airspeed a few knots either way and I could be in big trouble. The thought of wing divergence crossed my mind momentarily but then something else occurred to add to my fascination with the situation: My canopy was suddenly covered with a million short lines of green fire. The fire was accompanied by a low-keyed crackling sound. Fine, I thought, what next?"

Fuel? That was one relatively bright spot. I was just about on my estimate although I had been forced off to one side or the other of my course several times.

The Center controller considerately called me every now and then to tell me that he still was not painting my squawk or to ask me about flight conditions.

Suddenly, the aircraft shuddered; I pitched forward in my seat. I cinched up my shoulder straps and noticed with dismay that as the aircraft continued to shake and shudder, the airspeed was fluctuating 5-10 kts. The airframe seemed to be emitting a low rubbing sound as the airspeed fluctuated. I figured I was nibbling at the edge of compressibility. I concentrated on attitude. I didn't relish the idea of getting pitched nose-down under these circumstances. I squeezed off a little power, figuring I had more margin for airspeed fluctuation in the lower range than I had in the upper range. The whole sky seemed to glow in front of me. I checked the No. 1 needle hoping it would point to the thunderstorm activity. It was not much help, however, as it spun wildly, except for momentary erections on several widely separated bearings. The airspeed fluctuations increased as did the shaking of the aircraft. I thought momentarily about turning around but immediately came to the

conclusion that *that* was no answer to the situation. I thought also about descending so as to have more of a range of airspeed to play with but discarded the idea after considering that I'd have even more probability of stumbling into the middle of a full blown cell if I did.

The aircraft shuddered violently and the left wing dropped. I leveled the wings and decided the time had come for some positive action. I switched to Code 77, squawked EMERGENCY, called the Center, declared an emergency and requested all available assistance in circumnavigating the worst of the weather. The Center acknowledged and advised me to standby. In a minute or less the controller requested my heading. I gave it to him and he then instructed me to turn left to a heading about 45 degrees off my course. I complied.

The turbulence continued unabated and I noticed that I had mushed down to FL 430. The Center came back and advised me that they now had me in radar contact. A wave of relief swept over me. The controller continued to talk. He informed me that this would be a vector which would take me about 25 miles to the left of course at which time he would give me a turn back to reintercept the course at a 45-degree angle. He said he thought this would get me around the worst of the weather. I fervently hoped so. Things soon settled down and I eventually returned to course. The rest of the flight turned out to be routine, relatively speaking. But I still recall the elated feeling when I broke clear of all clouds at 8000 ft during the penetration.

The sound of the C.O.'s voice jolted me from my reverie. He was saying:

"Lt Smith's experience last night points up the increased hazards to flying that we can expect during the summer months. I urge all of you to review what the thunderstorm season means to you and your flying operations. To assist you, I have asked the ASO to prepare a presentation on the subject for the next APM."

The APM broke up and the pilots began to drift away to other duties. One or two stopped me to ask me a question about the flight. The fact is, during the course of the morning, I was asked many questions about the flight but there's one question no one got around to asking. Even though, in my mind, it was the most important question of all, I was glad no one thought of it. Nevertheless, it is one question which I intend to ask myself in the future – everytime – before presenting my flight plan to the ops duty officer. That question is:

Considering all the circumstances, is this flight necessary? ◄

Some Old Naval Aviation Proverbs

• HE (the maintenance supervisor) who routinely authorizes post-maintenance aircraft turnups or other checks without the required quality assurance inspection is guaranteed to be ineffective in promoting respect for the quality assurance program.

• HE (the aviation safety officer) who piles his flight gear on the floor in a corner of the readyroom can look forward to a lot of inattention at APMs.

• HE (the senior pilot) who notes a malfunction of an important aircraft system but who continues to bore holes in the sky for flight time purposes, should warn the crew to keep a sharp eye on the 2P when he gets his own aircraft.

• HE (the C.O.) who dismisses an incident with, "I can't understand it . . .He's one of our best pilots . . ." may not know his pilots very well.

• HE (the flight leader) who kicks the tire and lights the fire – and leaps off into the blue followed by his faithful wingman should save his breath the next time he attempts to impress on that wingman the importance of making a thorough preflight.

• HE (the supervising line petty officer) who wheels a vehicle around the flight line at 15-20 mph should have someone else present the lecture to new men on how to safely operate yellow equipment. ◄

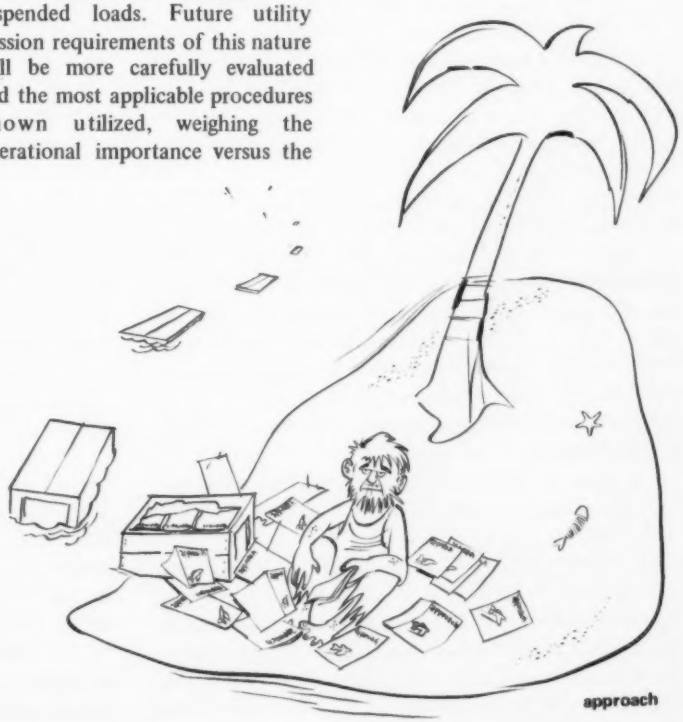
Short Snorts

SH-3A Vertical Replenishment

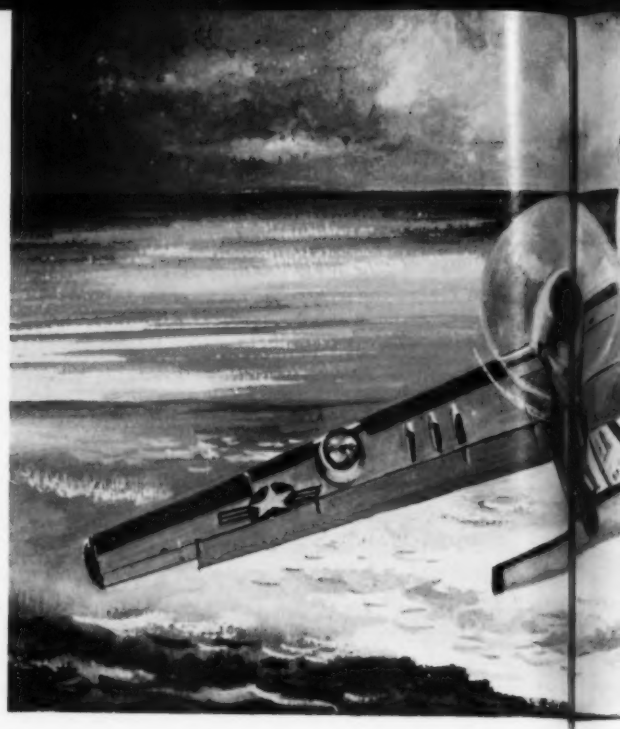
NORMALLY, vertical replenishment between ships is accomplished by the detachments of HC squadrons using CH-46s. However, in Vietnam and in the nearby waters of WestPac, exigencies of the combat zone sometimes dictate use of whatever is available to do the job. The story which follows concerns using an SH-3A to carry, externally, a main rotor blade in its shipping container.

Previously the squadron had successfully transferred similar loads. Although not considered beyond the realm of the SH-3A capability this does meet the requirements of an unusual operation. The blade container was suspended about 15 ft below the helo by straps from each of the four armament launchers. After a careful takeoff, and while transitioning into forward flight (about 60 kts), the container started swinging laterally. Before the pilot could take any corrective action the blade container flipped end to end, rose along the port side of the helicopter and struck the port side causing skin damage to the fuselage and breaking the HF antenna bracket. The container then fell forward and the straps caught on the forward port launcher with the high end in close proximity to the main rotor blades (see photo). The aircraft was eased back over the flight deck and the blade container was removed.

The C.O. of the squadron had some words of wisdom in his endorsement. He said, "It is fully realized that the SH-3A is not configured with external cargo sling hard points or designed for suspended loads. Future utility mission requirements of this nature will be more carefully evaluated and the most applicable procedures known utilized, weighing the operational importance versus the calculated risk, but always operating within the greatest safety margin that can be provided for our pilots and crews." *(And no more attempts to tow the ship either. – Ed.)*



Deadly Diseases



THERE are many forms of get-home-itis or get aboard-itis. Most aviators are familiar with a take-a-down-plane-to-get-home-to-mamma variety, the low fuel or bad weather forms or the dive-for-the-wire type, but I wonder if aviators have thought of some of the more subtle forms. Those forms which can be rationalized as "operationally necessary" until such time that the situation turns to a can of worms and lives are lost.

The weather had been bad all the way, looked just as grim ahead and the aircraft commander on the VIP flight was concerned about making his block time. A combination of weather and other factors already had him behind schedule and with an instrument approach required at destination he saw no way to make it. He knew several important people would be on hand to greet the flight and, by gosh, he had never made a practice of being late. He had no intention of starting now but how . . .

Suddenly they broke out into the clear over what was obviously a bay. It looked like the bay on which their destination was located so down they went. They notified ATC, requested cancellation of their IFR flight plan and began to feel better about the prospects of making that block time. A fast run up the bay at a hundred feet or so should do the trick he thought as he leveled off. So what if it isn't really VFR, there's plenty of water in sight; besides, the terrain at the end of the bay is flat. No sweat.

The aircraft commander peered into the gloom as they flew along, straining to identify points along the coastline of the bay.

The copilot, who had been strangely quiet till this time, suddenly burst into action. He took control of the airplane and went to full power and max rate of climb. The aircraft bearly cleared the 700 ft hills that were not supposed to be there.

They were in the wrong bay!!!

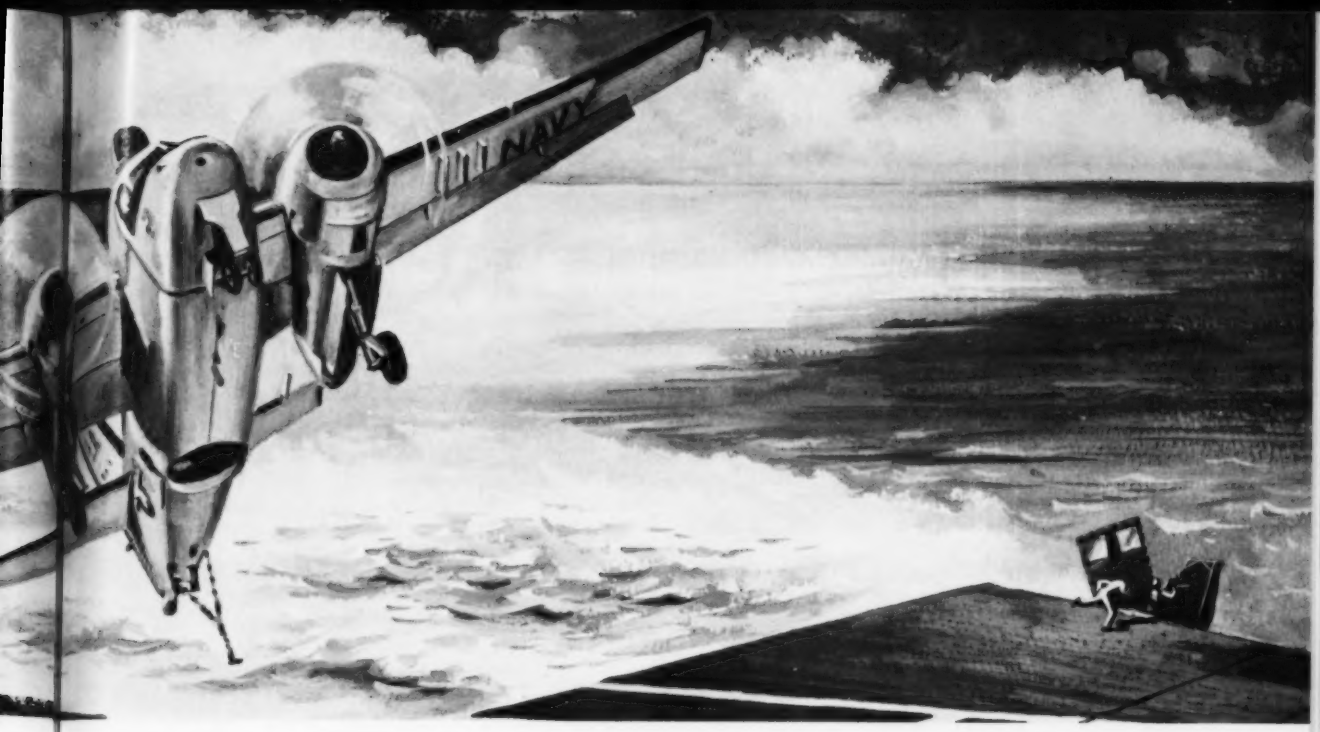
The pressing urgency that causes any aircraft commander to cancel his instrument flight plan under such poor weather conditions, to make a block time, has no place in naval aviation. This is a form of get-home-itis that can be prohibitively expensive. Not only does the Navy lose an aircraft and a crew but many years of valuable experience and leadership if the VIPs meet the same end as the crew.

Members of the parties of VIP flights normally do not imply to the pilot that the block time must be met regardless of the circumstances. The aircraft commanders should keep this in mind and, while every reasonable effort must be made to arrive on time, it is best to arrive in one, safe piece. Sound judgment and good common sense must govern in such situations rather than purely emotional considerations.

Another form of get-home-itis can be found in flying aircraft back to home base that should not be flown at all. Consider this example:

When the twin-engined plane arrived aboard the carrier in the late hours of the afternoon it was suspected that one of the engines was malfunctioning. Investigation aboard ship supported the suspicion. Nevertheless, the aircraft commander allowed himself to be pressured into making the return flight that night, engine problems notwithstanding.

Sure enough, just off the cat the suspect engine began to unwind and had to be feathered. The luck of the Irish flew with them that night and the return trip to the beach was an uneventful as an engine-out, night



overwater flight can be.

In this case the aircraft commander should not have allowed himself to be pressured into ever attempting flight under these conditions. True enough, there may have been circumstances which the aircraft commander felt to be beyond his control in this case but naval aviators must not allow themselves to be pressured into attempting foolhardy undertakings or undertakings that are beyond their capabilities. Furthermore, seniors should ensure that aircraft commanders are not forced into such situations. It is understood that operational necessity changes the advisibility of such efforts, yet the fact remains that good common sense must prevail during such decision-making.

Get-aboard-itis also falls into this category. All too often the dive-for-the-deck or the easing-gun-in-close syndrome has cost dearly in life, limb and airframe replacement.

In this area the carrier aviator must be willing to fly repeated passes, working on his errors and listening to the LSO if success is to be achieved. Settling for less than the best can often result in settling for the worst i.e.; the purchase of a section of the round-down.

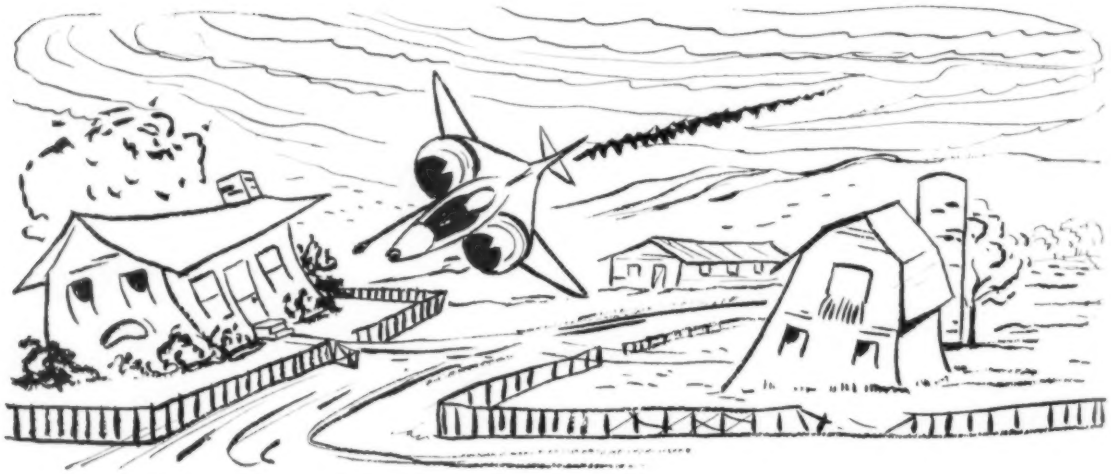
The first pilot had successfully completed his quals and the two had switched seats. The second pilot started off with a series of approaches which were shaky at best. Aside from the usual ball control and lineup problems he persisted in easing gun and getting slow and cocked up in close; feeding in almost full nose-up trim in order to hold his attitude. The LSO had called him several times, first telling him not to anticipate a cut and finally warning him that one more such approach and he would be waved off.

Well, sports fans, he did and he was. The next approach was of the same caliber as the others so the LSO hit the waveoff button. The pilot however, was expecting a cut – so he took one, then realizing he had been waved off, went to full power. The combination of nose-up trim, full power and slow airspeed caused the plane to pitch almost straight up rising to about 200 ft where a near-stall condition was encountered. The pilot effected a straight ahead fall through by reducing power to idle which resulted in the nose falling through until it seemed to be pointing right at the LSO. At 75 ft or less, full power was reapplied and again the nose rapidly reassumed its extreme nose-high attitude. Again the stall, power to idle and this time the pilot managed to catch everything with power as the nose passed the horizon. For a few moments that bird looked like a drunk seagull as it staggered about attempting to regain full control and normal flight.

Needless to say, the LSO's next comments were pointed and among his instructions were orders for a quick trip to the beach.

The urge to get home, get aboard or otherwise end an arduous flight appears to be strong in many naval aviators. It is agreed that it is important to get home – but only if you can do so safely and in one piece. ◄

Which Way Is Up?



I WAS at 1800 ft MSL (1500 AGL) on the downwind leg of a GCA to NAS Westcoast, in actual instrument conditions. The weather was 600 ft overcast, 1 mile visibility in ground fog. Just as I was given a heading change from 180 to 140 degrees and had commenced the turn, I lost my generator. I immediately actuated the emergency generator but it did not come on the line. I pulled the handle several more times but nothing happened.

Since I knew the tops were at 2600 ft MSL, I decided to level the wings and pull up through the goo. I tried to use the needle and ball, not realizing at the time that they are electrically operated and, therefore, were not functioning. I accelerated at 100 percent rpm and initiated a 2G pull at what I thought was a wings-level position. The next thing I knew, I was in visual contact with the ground at 300 ft AGL in a 60 degree right bank at 1-1/2 to 2Gs, with a nose-level attitude.

I immediately leveled my wings and checked all my instruments to establish which ones worked. I only had an altimeter, airspeed indicator, a rate-of-climb indicator and a wet compass. Since the visibility was restricted to about 1 mile, I was afraid that if I remained at low altitude below the cloud bases I would run into something. I decided to zoom climb to VFR conditions on top.

In the clouds, the altimeter rapidly increased to 1200 ft MSL, then stopped. Since I did not know which wing was up, I made alternate turns to both port and starboard while maintaining back pressure on the stick in an effort to reinitiate a rate of climb. I had decided that if the altimeter started down I was going to eject.

Suddenly, the altimeter rose to 1800 ft MSL, then stopped again. I repeated the turn procedure and finally broke out of the clouds at 2300 ft MSL in a 60 degree, nose-high attitude with 200 kias. I had experienced moderate to heavy G forces during these maneuvers.

As I was climbing through FL 250, proceeding to NAS Inland (my VFR alternate field), I discovered that the generator NORMAL/BY-PASS switch was in the BYPASS position. I moved the switch to the NORMAL position (proper position for flight) and immediately the emergency generator came on the line.

During the VFR climb I recontacted approach control. Another aircraft from my squadron

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

(the squadron safety officer) heard these transmissions and joined on me. He observed that I was also dumping fuel although all my switches were off as they were supposed to be. (I did have a buddy store on board but I did not know the position of the store switches.) After talking the situation over, we elected to shoot an emergency approach to NAS Westcoast. I flew on the safety officer's wing because I did not want to lead into the clouds. We made an accelerated descent to a radar controlled penetration and a GCA controlled low precautionary approach. Since I did not have regular speed brakes with my emergency generator extended, we did not use speed brakes in the descent, penetration or landing. We broke out at about 600 ft AGL and I picked up the approach lights and the runway at about 1-1/2 miles. I landed and kissed the ground.

Prior to takeoff I had preflighted the emergency generator NORMAL/BYPASS switch in the NORMAL position. When I reached back to turn on the AJB-3 switch, I must have accidentally turned the emergency generator NORMAL/BYPASS switch to BYPASS. I noticed in the checkers that I did not have an AJB-3 so I activated the switch again.

We are already in the process of removing the AJB-3 switch. It was installed as an experimental process to try to improve the reliability of the AJB-3s. It worked pretty well but ComNavAirPac directed that it be removed.

Electrical Failure Mouse

This is an exciting story which, happily, ended well. It points up the absolute requirement that pilots know their aircraft. Electrical failure under actual instrument conditions is the worst time imaginable to try to determine which instruments are functioning.

In this case the pilot did not immediately recognize that the turn needle is electrically operated, which almost cost him his life. Another point which ought to be noted here is that while the turn needle is electrically operated, the ball is not. The ball merely rests in a cylinder curved upward at each end in a semicircular shape with its movement dampened by an enclosed fluid. Its operation is completely independent of any outside force, except G force.

The pilot's decision to get on top of the overcast was probably the best one possible in view of the low ceiling and the visibility and the known tops of the clouds. However, had the tops of the clouds been at FL 230 instead of 2300 ft, then it might have been a different story since a climb of this magnitude is not feasible without attitude instruments. In such a case, the pilot's only courses of action would have been to abandon the aircraft or try to find his way to the field under the low ceiling and in reduced visibility. The value of a detailed knowledge of the operating area is obvious in such a situation.

The pilot's reference to the AJB-3 ON/OFF switch needs comment, also. This switch is apparently one of a number which were installed at the operating level in some A-4 aircraft on the assumption that selective management of the AJB-3 by the pilot would improve its overall reliability. This assumption met with many objections and as a result was never approved at the NavAirSysCom level. Judging from this Anymouse report, though, there were at least a few aircraft still incorporating this switch as of November 1968.

To summarize, any failure of an aircraft system often places immediate demands on the pilot. If weather or other factors are complicating the problems, it becomes doubly important, as in this case, that the pilot be alert, well-versed in emergency procedures, have a good knowledge of his aircraft and its systems – and have the ability to come up with some good headwork, at once! ◄

CORSAIR I

Every profession has its classic 'in' jokes or distinguished humorous writings that are so dear to the hearts of the oldtimers, particularly when reminiscing about the good old days.

Since so many of the new breed of naval aviators have never been exposed to the joys of flying Ol' Hose Nose we present this page of nostalgic photographs from the day when there was only one Corsair.

Then from the NavSafeCen museum of miscellany we discovered another oldster that's well calculated to get you misty all over, but perhaps it would be better if you looked over the shoulder of one Caleb Flerk in order to find out just what was the

Trouble of a Serrious Nature

Mrc 8

Dere mr Mac Arty

Inclose i am attach a pitcher of my arrplane in which you will note their has bin some trouble of a seRRious nature i am desirous to leave you here about. This here particklar arrplane orichinally made by them plumbers of yourn was solt to me at a War Assets Amminstration sail in the town of Hockeyjock Ark. lass month, a mister Morris Finestine was agent for the tramsackshun. This Finestine was passin through town at the time bying up all kind of serpluss equipment and got w&&& wind they was a arrplane stashed away in the county. This here particklar job was flew in hear back in awgust of 45 by a navy fairy pilot and had set over to the field in North Hockeyjock ever since. The enemy Navy threw in there towl and quit, and this feller here this over the raddio. Immedaiteley when he hear this he set down at the nearest field which was ours and inside of a hour he was drunk lying stiff in Jake Bragans place, celebratin peace. From the time this navy feller land here i sort of had my eye on this here plane. i and george murch hitch up the team and haul the arrplane quiet like over behint the willows on east 40. We figger we leave her there till things quiet and calm down, then we use her for sportin about in the evenings after chores.

Well, we keep things perty quiet an first thing we know it look like the navy has plumb forgit the hole thing. WE just about feelin good about this when $%7F when this nozey gadjst agint slip into town and get the wind up there is a arrplane hid in the area This feller snoop arount on the sly and sure enuff it dont take the bussard long to ease down behint the willow and see her settin there neat as a plover's egg. We dont argue with this agint and after he clam down some cool see can he arrange some sort of deal alltho it will be unregglar and will require some fancy maneuverin. He come arount the next nseenth mornin and real confidenshall like tell us he worked out a oral contrack whereby we just pay him a couple hunnert dollars and own the airplene out rite free and clear and that he will forward the papers when he get to washington in a few weeks. Bein smart we pay him a hunnert dollars and agree to pay the rest when he write usfrom washington and he hauled

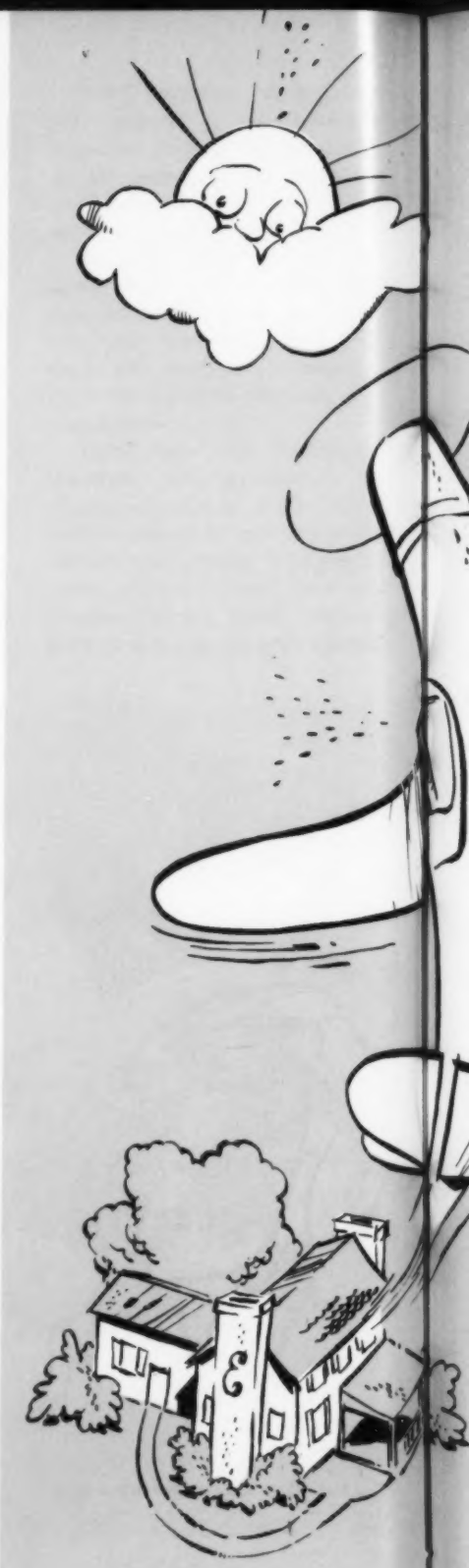
The Navy feller was celebrating the peace.

•out of town and we aint heard from him since.

Well, george and i haul her out the day the Fair opened and grease her down real good and pump up the tires and get her all set to go. She been settin now for aiteen month but bein behint them willows has kept her pretty well from weatherin. Havin flewed with youn Sprowl several times and havin seen all them movies and read all them stories about arrplanes i have a good deal of ecksperience to d&&& drawr on and am very compatent of myability.We set her out on the edge of the fair grounds and point her over at Ralph Easbys place aimin right be tween the chimmineys which is doo north. i red in a book onetime where most arrplanes take to the air much better if theyre aimed north. We gi figger havin set as long as she has thet she might need a-fuelin so george fetch a small drum of coal oil from The Store and she take all of it. The sign arount the spicket said something or % other about'aromatik spirits'so Jake Bragan kick in wit with a quart of his best white Mule. She kick up abit at [illegible] 1st but stop smokin and fizzin when we clamp the tank cap back onto her and quiets down right soon.

When we are all finished i get inside and set down in the chair and start figgerin how to start the motor. Its a right gusty day and while im settin thair the wind keeps slapping the joyce stick arount and it rap me a few right sharp whacks in the knees. Thet navy feller was in such a rush to get over to the saloon thet he left every thing lay loose like. George and i do nt take long to see whats wrong however, both bein natural borned mechanicks, and we just take sum bailin wire and lash thet thrashin joyce stick right smart over to one corner where shes outen the way and strapped down real go od. Yessir, when i and george lash em down, they stay lash ed.

We pay hob trying to get thet motor start as all &&& them swtches inside seem to start all sorts of whirrin and whistlin sounds goin all at once and in b&&& busier'n a one-legged man in a sack race flicking all them switches and pushin and pullin all them knobs tryin to crank the motor over. i finally get her to kick and sput a few times and all of a sudden with a roar she catch, backfire loud enough to scare a deaf mule, and shoots a streak of flame an fire a yard long out the eckzawst hole George is standin on the wing bendin over takin up a shoe laice and it catches him right smart and like to scare



. . . . we're goin strait up an im lookin plumb down old Easby's north flue.

him half to death, Last i see of him hes still runnin acrost the field hs like a scalded bunny.

They was quite a crowd gathered by now waitin to see me fly this here job $$$ cheerin and callin to me so i get set to go and start pushin and pullin a bunch of handles and knobsreal cautious like until finally i find the one that jazzes the engine right good. Its got a little [illegible] button onto the top of it. I jazz her a few time to get the crowds attenshun and when theyre all wavin to me and yelling, i look out at em, leave em have a big smile, and spit real casual and delibbarate-like i seen that feller do in the movies, and then jam the handle plumb up to the hilt. The motor leaves off a roar the like of which i aint ever heerd in all my borned days and i get shoved aginst the back of the seat so hard i caint hardly catch my breath and thet arrplane starts buckin and bouncin acrosst the feeld like a buck stallion. I never feel so much%$ power strapped onto one machine in all my life and the groun d keeps whirring by faster and faster and them chimneys over to Easbys keep growing bigger and bigger. It dont take me long to realize thet things arnt goin rite about the time i see peple scatterin for cover from Easby's yard so i start lookin for the handle which will hist the arrplane off the groun. Theres a wheel says "nose-up" on it so i quick-like give her a twirl and then shut my eyes. I feel thet arrplane hop off the groun and start twirl in aroun in the air like a oak leef in a twister and when i take a peek, we're goin strait up an im lookin p lumb down old Easby's north flue. Im not looking for long tho as the next thing i know the sky, the groun,g* the clouds, trees barns, cows, the sky are all jumbled up and icant figger thex where i am from one minute to the next. All of a sudden ti the plane starts shakin and jumpin arount like its got the ague and the motor starts snarlin an moanin powerful loud and then the groun starts comin up right fast. I shut my[eyes again and holt on real tight x an then its all over, Theys a terrific jolt, a big splash, then alls quiet. I figger sure enuff im deader'n hell an on my way to hevvin until I feel thet cold water start creepin up arount my butt an when i open my eyes dam if i aint settin plumb smack in the middle of Hooleyhans CreeK with a bunch of reed birds clackin an skwakin all excited over my head.

Well, Mr Mac Arty, thats my story an bein a man of over average intelligents an unlimited patience , i have

gave a considdurible mount of thought to this insident and i guess i dont need leave your immagination further guess how mad i am an how dissappoint i am regards yore arrplane. I cant help but think of all the other peeple who put their strickest connfidents in them machines and 1st thing you know somebuddys gonna get his afore he knows what hit im. Therefore an since you are the service manager of this here Chancey sikorsr corsehair company i feel you have a very responsible service to perform to all then peeple who may be desirous of fly yore arrplane. Ive bin settin out onto the back stoop for hours on end figgerin this thing out and watchin all the birrds akin to this country real careful-like. Ive watched them when they dident know i was watchin them and this inkloods wrens, sparrers, jaybirds, hawks, doves, crows an woddy peckers. My addvice to you Mr MC Arty is for you to tell them big smart enjineers up to yore place to spend more time outside doin jist whay ive bin doin cause it wont take ANY DAM FOOL long to see thet them birds would jist as likely bust their s too if some idiot had stuck their wings on upside down too.

Idigently,

Caleb Flerp

'. . . . dam if I aint sittin plumb smack in the middle of Hooleyhans Creek . . . .'

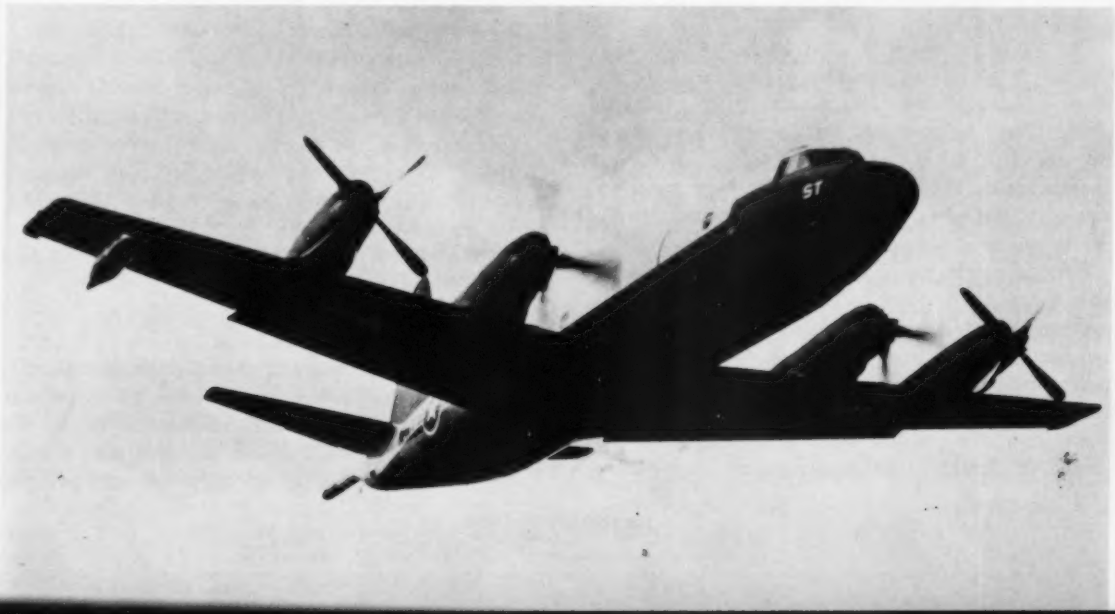
Prop Pump Warning Light

THE propeller pump warning light in the P-3 aircraft has been responsible for saving many engines and, in most cases, later has revealed questionable maintenance preflight and servicing practices. Propeller pump lights, when illuminated, usually indicate low reservoir oil. Continued operation of the engine may result in a pitch-locked propeller and damage to the engine as well.

There have been several instances recently where correct actions by pilots and flight engineers have averted disaster. One such instance occurred during climbout. In this case a fluid leak at the No. 3 prop was discovered. The pilot briefed the copilot and flight engineer to be alert for a prop pump caution light and outlined the steps to be followed in case the light illuminated. Later, while still climbing, the leak appeared to be getting worse and the No. 3 engine was secured. The prop initially failed to feather at 260 kts but did feather when airspeed was reduced to 200 kts. Postflight inspection revealed that the No. 3 engine prop pump reservoir retaining pin was not in position which allowed the prop fluid to escape. Undoubtedly, the timely action taken by the crew occurred just prior to illumination of the prop pump warning light. Some flight engineers, when questioned, expressed the belief that cycling the props during the auto-feather preflight check, with an accompanying absence of leaks, was sufficient proof that the retaining pin was inserted. Not so! The only positive check that the pin is inserted is to check it visually prior to flight and after servicing. One squadron made a local change on the daily servicing MRC cards 19.1 and 21.1 and now leaves the access cover open after inspection and servicing so that the flight engineer personally can inspect the security of the retaining pin.

Another instance occurred while a P-3 was cruising at FL 170. The No. 1 engine had been secured for fuel conservation when the No. 4 engine oil cooler flap began giving trouble. The pilot decided to bring No. 1 engine back on the line and prepared to shut down No. 4. However, this was not to be. As the No. 1 engine was being restarted the NTS (Negative Torque System) INOP light illuminated and the engine was resecured. The flight was aborted and a course was set toward the nearest suitable field. During the return flight the No. 4 engine oil cooler flap switch continually had to be closed to maintain allowable oil temperature. The pilot decided to make a loiter shutdown on No. 4 and intended to bring it back on the line prior to landing. As he neared his destination and attempted to restart No. 4 the prop pump warning light came on so the No. 4 engine was secured again. Forty minutes later the pilot made a successful two engine landing. Postflight inspection revealed both No. 1 and No. 4 prop oil reservoirs were low and the No. 4 oil cooler actuator had failed.

In both cases shortcomings in preflight inspections and servicing procedures were disclosed. It doesn't make sense to take off with tanks, reservoirs and systems that are not full. Fill 'em up and secure 'em.



The Eye and I

by T. A. Farrell, M.D.

THE IMPORTANCE of good eye function in aviation has been recognized for a long time. Your flight surgeon checks 16 items concerned with visual and ocular functions at each annual physical. Approximately 50 percent of all disqualified naval aviation candidates are "downed" for ocular defects.

The eye as a sensory organ commands more brain space than any of the other senses. It requires the functional assistance of six out of 12 special cranial nerves. Functionally, the eye is considered a direct extension of the brain.

The job of the eye is to see. Nothing yet devised by engineers or doctors can equal the eye's ability to detect, follow, identify and discriminate. Many technical advances have far surpassed certain single functions of the eye (EROS II, Airborne Collision Avoidance Systems, etc.), but all the integrated black boxes and computers will never match, pound for pound, the eye and its associated brain areas for performance.

For the eye to see it must have light coming into it from the object it views. As the light rays pass through the clear "watch crystal" cornea and the lens of the eye, they are bent (refracted) to focus on the photosensitive back portion of the eye, the retina. In a person with normal vision, they are focused on a highly specialized retinal area, the macula, which is an area 3mm^2 and consists of about 450,000 photoreceptor cones (each of

Dr. Farrell is a former Navy Flight Surgeon now in his last year of residency at the Massachusetts Eye and Ear Infirmary in Boston. Dr. Farrell served as Flight Surgeon with VP-4 and Fleet Air Wing Two serving tours of duty in Okinawa, Hawaii, Japan and Viet Nam. He also served at NAS Brunswick, Maine prior to embarking on a career in Opthamology. Now a LCDR in the Naval Reserve, Dr. Farrell explains some of the phenomena associated with the eyes which aviators may experience.

which is 0.002 to 0.004mm wide). These cones are most effective in daylight illumination and are responsible for sharp visual acuity and color discrimination.

The other light sensitive cell of the retina is the rod which is found in greatest numbers in the peripheral retina. Rods detect movements and shapes in shades of grey. Night and side vision are mediated by the rods.

For the eye to detect the smallest object possible, the object must contrast with its surrounding area and produce images that, when focused on the retina, stimulate two cones separated by an unstimulated cone. This all boils down to the fact that the smallest object to be seen must produce two retinal images separated by one cone (or 0.004mm) which equals approximately an angle of one minute.

This fact is used to make the size of the test letters on all visual acuity charts. Those all important 20/20 letters are made to form an angle of five minutes at the conventional test distance of 20 ft. Thus in the recorded 20/20 figure, the top or first number denotes the distance you stand from the chart and the bottom number expresses the distance at which the smallest letter read makes an angle of five minutes (by convention). In easier terms, the top number is the distance from you to the chart and the bottom number is the furthest distance away a person with "normal" vision can accurately discriminate that letter or line of letters. Most aviators fall in the "better than normal" range of 20/15 vision.

The eagle-eyed aviator obviously has great vision but how? Statistically, 10 percent of the population 20 to 30 years of age has no refractive error, whereas, roughly 70 percent is "far-sighted" and 20 percent is "near-sighted." Many of the nonaviation types claim that all aviators are "near-sighted," but in truth they are most often far-sighted. Technically, this is called hyperopia (or hypermetropia) and simply means that incoming parallel light rays are focused behind the retina! The eye is too "short" – short of curvature in the refractive front surface of the cornea or axially too short. However, by accommodating, a process that is normally employed to focus near objects, the far-sighted person can bring the point of focus forward onto the macula. Unfortunately, this ability to focus is not only a function of muscles within the eye but is also related to the elasticity of the lens within the eye. The older person's lens slowly loses its elasticity and he can no longer focus to see clearly – especially when reading. The common complaint is, "my arms are too short," and reading glasses or bifocals are added to assist in scanning the ever-increasing mountains of paper work and the smaller print in airway charts. There is no other way to improve the vision when this happens.

On the other hand the near-sighted (myopic) individual has the opposite problem. The myope's eye is too long and focuses light in front of the retina thus requiring glasses which move the focus further back in his eye. Accommodating makes his vision worse as it moves the point of focus further in front of the retina and is no help. Most myopes have poorer distance vision than far-sighted people and very few can meet the visual standards of aviation. Myopes, on the other hand, can see well up close in the focal range of their eye and generally do not need reading glasses as early as hyperopes.

Obviously, the eyes need to be cared for properly if they are to function well and often they seem to be the most trusted and jealously guarded possession of all aviators. Your eyes are quite well adapted to caring for themselves and their snug home in the boney eye sockets generally protects them from most danger except for direct frontal assaults. Within reason, they cannot be harmed by hard use but you know how tired your eyes become from studying and from long periods of reading. Usually, however, a short rest away from the books will restore their vigor.

There are special hazards to the eyes in aviation. The brightness and glare from sunlight, especially at high altitudes, can be combated with sunglasses or tinted visors on hardhats. The eye effects of G (grey to blackouts) can be minimized by good physical conditioning and using anti-G suits.

Bright light can impair dark adaptation. Wearing red glasses enables you to dark adapt while working in a white lighted area. Red light, if used, does not bleach out the photosensitive pigment in the rods. When dark adapted, the inadvertant use of a white light can temporarily incapacitate you. But if you have closed one eye before using the light, this impairment can be minimized. Using a visor at all times can help prevent ocular injuries that can be coincidental with emergency egress situations or being hit by foreign objects, such as during bird strikes.

Other visual problems, such as eye fatigue from long low altitude flights, can be reduced by proper attention to physical fitness and adequate rest.

Qualified naval aviators have no need of any eye exercises. Exercises that tend to correct some ocular muscle imbalance (the only type of useful eye exercise) are not warranted for aviators because such defects are usually disqualifying. Thus the best exercise is normal use and this will not harm the eyes.

Again, good vision is necessary to assure *safety of flight.* Any aviator or air crewman who has an ocular complaint should "see" his friendly flight surgeon immediately. ◄

On the return flight to Atsugi after an early morning pickup of six passengers at Yokota, the UH-46A headed

INTO THE RISING SUN

THE work day had begun much earlier for the helicopter crew. The copilot, with whom this story is principally concerned, had arisen at 0200 after only two hours of restless, noise-disturbed sleep. The day before, after a normal day's work, he had assumed the on-board duty as SAR copilot. He had eaten supper at the club, then had read in his room in the BOQ until midnight. At 0200 he was awakened for an 0300 briefing for a passenger pickup at Yokota Air Base an hour later.

Takeoff was at 0345 and the ensuing 20-minute flight was uneventful. On landing at Yokota the crew learned that the passengers would arrive on a later flight. Electing to return to Atsugi vice standing by, they took off at 0445 and landed at 0500. The copilot dozed in a readyroom chair until told to man the aircraft at 0715 for the second trip.

Takeoff and flight were again uneventful except that the pilot noted that the copilot, who was unfamiliar with the aircraft, evidenced some roughness on the controls. At 0740 the helo landed and picked up the six passengers. Takeoff for the return to Atsugi was at 0825.

"Our departure heading was SE," the pilot recalled later, "and for a while the sun was in our faces."

NAVY

After turning southwest to bypass Rankin Field the pilot made a position report to Atsugi tower. At this time he saw that the copilot's head was thrown back and moving jerkily from side to side. A crewman summoned to the cockpit restrained the copilot as he went into convulsions and grabbed at the flight controls. He lapsed into convulsive leg and arm movements, striking the rudder and cyclic controls. The fact that the copilot's shoulder harness and lap belt were secured prevented completely uncontrollable activity during the seizure. Nevertheless, the pilot had considerable difficulty maintaining control of the aircraft.

The copilot lost consciousness for the next 10 minutes during which his convulsive activity waxed and waned. At one point the crewman tried to check the copilot's tongue to make sure he could breathe but he could not open the copilot's mouth because his jaw muscles were contracted.

Declares Emergency

The pilot declared an emergency and landed. Again the copilot began to reach for the controls and had to be restrained. With the aid of the crash crew he was forcibly removed from the cockpit through the emergency exit and taken to the dispensary. On arrival at the dispensary he was dazed, groggy and disoriented. Within an hour his mental state cleared completely and he was fully recovered by the time he arrived at the naval hospital for neurological evaluation.

During neurological evaluation his EEG or electroencephalogram (brain wave test) was normal until photic (light) stimulation at 10 to 12 flashes per second was attempted. At this time seizure activity was noted and the procedure was stopped. All other tests and x-rays were normal. He was referred to a medical board for disposition.

Flicker Stimulation

Evidence indicated that the copilot had a generalized seizure in the cockpit brought on by the flicker photic stimulation of sunlight through the rotor blades of the helicopter, the investigating flight surgeon reported. Fatigue was named a contributing factor. The copilot later gave a history of marked aversion to this type of light stimulation for several years. Up to this time he had been able to avoid it by turning away. The flight surgeon thought it significant that the copilot had never had a screening or baseline EEG. The copilot had flown helicopters many times over the years with unqualified personnel in the copilot's seat.

Possible Second Case

Although the reporting flight surgeon did not bring flicker stimulation into the discussion of a case which happened six months prior to the one described above, there are similarities. On a southbound morning flight along the coast, a crewman who was sitting in the copilot's seat in an SH-34J convulsed with generalized movements of his arms and legs. During his muscle spasms he pushed uncontrollably on all flight controls. The pilot had extreme difficulty controlling the aircraft and at times came within 4 ft of the water. (The report fails to mention whether or not anyone else was aboard.) Declaring an emergency he landed on a nearby public bathing beach. A Coast Guard helicopter flew a flight surgeon to the landing site and the aircrewman was taken to the hospital.

The flight surgeon reported that the crewman was totally disoriented, ataxic (uncoordinated), sweating profusely and complaining of a very severe headache. His confusion lasted approximately one hour. The crewman had had only three hours sleep the night before because of a change of shift plus early arousal for the helicopter flight. Just prior to the seizure he became very drowsy and began to fall asleep. He had no past history or family history of seizure disorder. Diagnosis was a single grand mal seizure probably precipitated by some sleep deprivation. He was found to have an abnormal EEG. He subsequently received a medical discharge.

Mechanism Unknown

The exact physiological mechanisms underlying flicker-induced seizure are not known. A light flickering steadily at a frequency of approximately 4 to 20 times per second can produce unpleasant and dangerous reactions including nausea, unconsciousness or vertigo

in apparently normal subjects. It is believed that susceptibility is increased when the subject is fatigued, frustrated or in a state of mild hypoxia.[1]

Fatigue induced by "channel fever" was a factor in a flicker-induced convulsion experienced by an apparently normal crewman in an SH-3A several years ago. At the end of a 7-1/2 month deployment, because of the excitement of homecoming, he didn't eat or sleep for the 24-hour period before the fly-off. He said later he had felt "perfectly well – only a little tired." After the helicopter had been airborne for about 10 minutes, he began to feel sleepy. "All I could see was a bright flicker of the sun through the rotor blades," he recalls. He suddenly lost consciousness and had a convulsion. The aircraft immediately returned to the ship.

The aircrewman's past medical history was completely unremarkable. He had no history of previous seizures or unusual reactions to fasting or to flicker. He had flown regularly as an aircrewman for several months without headache, fatigue, sleepiness or vertigo while subjected to flicker. Medical tests were normal.

After extensive tests, one of which duplicated the conditions of no food – no sleep for 24 hours, the neurologist was of the opinion that although the aircrewman had no demonstrable organic disease, he had "an unusual susceptibility to flicker when also undergoing sleeplessness and fasting."

Not Confined to Helos

Photic or light stimulation is not exclusively confined to helicopters. Two physicians from the Air Force School of Aviation Medicine have reported two cases involving nonhelicopter personnel.[2] One was a B-36 tail gunner who while scanning the engines last remembers seeing the sun through the slowly turning propeller blades. He had a grand mal convulsion in the aircraft; he had never had a seizure previously. The second case involved a pilot serving as airdrome officer. While standing on the ramp waiting for an incoming C-54 to shut down he noted the rays of the setting sun through the revolving propellers and had a grand mal convulsion on the ramp. In both these instances the seizures were reproduced in the laboratory.

Activates Brain

The fact that a flashing light of a certain frequency can activate the cerebral cortex of the brain in certain people and produce an epileptic seizure has been known for some time. In the early 1950's instances of children experiencing such seizures while watching flickering television were reported. Some persons experience discomfort when driving or riding by rows of trees or fences through which early morning or late afternoon sunlight is shining.

The same sensations are said to be produced in susceptible persons by the rotation of an idling propeller or the intermittent flashing of an aircraft anticollision beacon reflecting from clouds. It has also been stated that the flickering light effect of rapidly oscillating windscreen wipers has been shown to cause a "lowered state of alertness amounting occasionally to drowsiness or even worse in susceptible persons" with nausea and dizziness also occasional symptoms.[3]

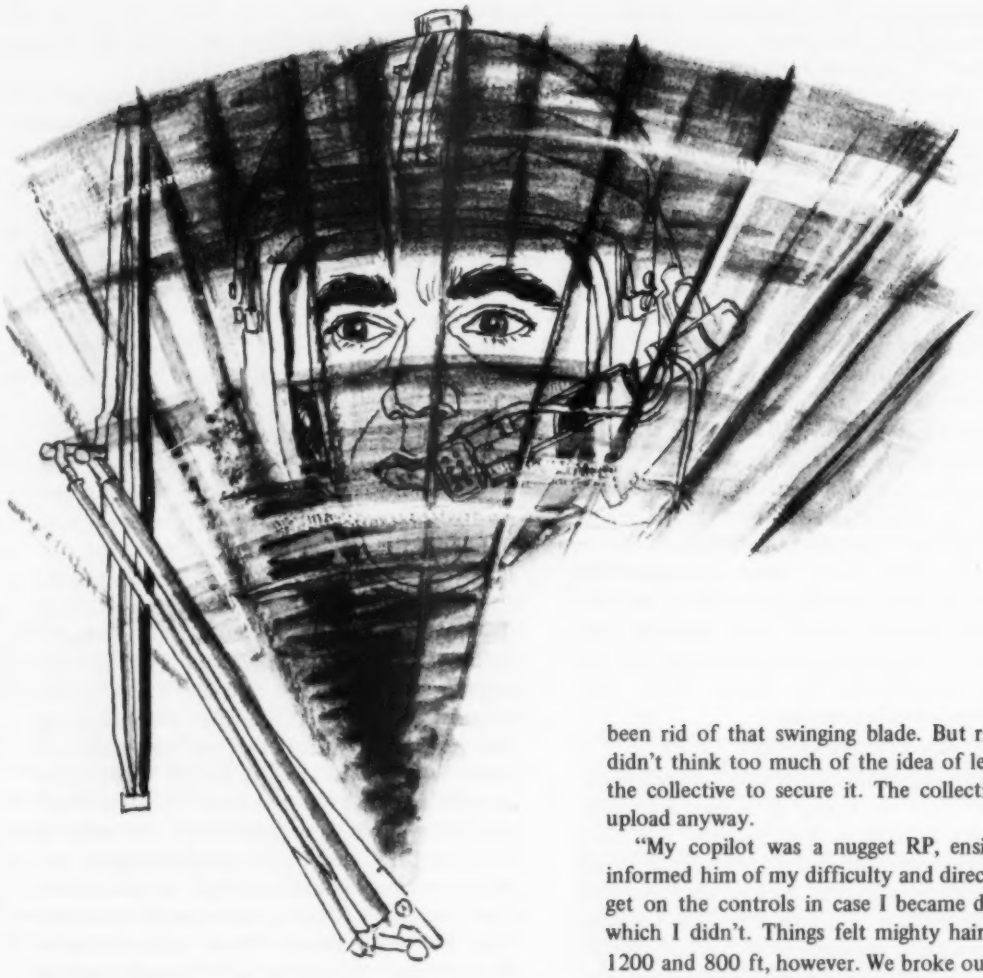
A *Sea King* pilot described his bout with windshield wiper-induced vertigo in the March 1963 *Helicopter Crossfeed:*

> "I had filed IFR from Jax to Key West in an SH-3A. Matter of fact, I had been on an IFR round-robin with stops at Tyndall, Pensacola and Jax. The climbout and trip (4000 ft assigned) were uneventful. A stationary front was located parallel to the Gulf Stream just south of Key West. Boca Chica was bouncing up and down between 200 ft (heavy rain) and 1200 ft. I got an approach to the sea lanes which is a modification of the old seaplane tacan approach. It starts at the 15-mile gate at 1500 ft on the 273 radial. Everything was fine until the turn inbound. We had made our transit from the 356 radial to the 273 radial on the 15-mile circle at 1500 ft in solid stratus with light to moderate rain. For some reason I decided I'd take the time to turn on the windshield wipers just before intercepting the 273 radial. If you've never used them in the SH-3A, they actually bump the front end of the aircraft. I never noticed them to be particularly distracting in VFR weather before and had never used them IFR. I was suddenly aware that I could hear them bumping and felt them in the seat of my pants. My scan was peripherally catching the bottom inch or so of the blade.
>
> "Even then I paid little or no attention to them until I rolled out inbound and started my descent on 093. Then I got struck with the worst case of vertigo I've ever had. I found myself forcing the VGI to stay level and every time that wiper thumped I'd swear I was kicked another 10 degrees of bank beyond 90 to starboard. It got progressively worse to the point where my rate of descent got erratic due to intentional fixation on the VGI. Right then I'd have given $500 to have

[1] *Navy Flight Surgeon's Manual,* p. 366.

[2] Berry and Eastwood, "Helicopter Problems: Noise, Cockpit Contamination and Disorientation," presented at the 30th Annual Meeting of the Aeromedical Association, 1959.

[3] *BOAC Air Safety Review,* September, 1963.



been rid of that swinging blade. But right then I didn't think too much of the idea of letting go of the collective to secure it. The collective had an upload anyway.

"My copilot was a nugget RP, ensign type. I informed him of my difficulty and directed him to get on the controls in case I became disoriented, which I didn't. Things felt mighty hairy between 1200 and 800 ft, however. We broke out in rain at around 300 ft with about one-mile visibility . . . . I've been through the old green card course . . . . have a lot of real gage time in 5400 hours, instructed instruments for years and I still had to call on all of it to keep from being thrown."

Actual seizures brought about by flicker light stimulation are a rarity in naval aviation. Most persons with a tendency toward this reaction are eliminated by the Navy's physical examination standards. The neurology department of the Navy Aerospace Medical Institute at Pensacola does a baseline EEG on every student aviator prior to commissioning.

Generally speaking the hazard of flicker in naval aviation is that it can cause subjective sensations including vertigo and can induce drowsiness in some persons.

Navy Study

A few years year ago Dr. Laverne C. Johnson of the Navy Medical Neuropsychiatric Research Unit, San Diego, carried out extensive tests on a group of 102 helicopter pilots stationed at Ream Field.[4] He found that clinically there was no record which indicated an EEG response to light stimulation that could be classified as even borderline abnormal in this group of pilots. Light stimulation, however, did identify pilots who had subjective feelings of discomfort during the flickering light and perhaps of more importance, the study states that in at least one-quarter of this sample of pilots the degree of their alertness was markedly affected during flicker.

Intermittent light, Dr. Johnson states, can be the source of two potentially serious problems for the helicopter pilot: vertigo and impairment of consciousness.

"Flicker vertigo may be less serious from a purely medical prognostic viewpoint in the individual case," the report states, "but may have the same expensive and tragic consequences if it is reponsible for an aircraft accident. In addition to the sensations of spinning and turning, flicker vertigo is also described as a feeling of dizziness and/or nausea occurring during exposure to intermittently flickering lights. Various subjective descriptions have been applied to the symptoms: 'uneasiness,' 'nervousness,' 'dizziness,' and in some instances a feeling of severe panic. In most cases, especially where exposure to flicker is of short duration, the sensations are reported to be only mildly disagreeable."

One of the questions posed in Dr. Johnson's experiment was: Can flicker per se interrupt functioning? Investigators found that performance was not affected by light stimulation when the subject's attention was deliberately focused on the task at hand.

Subjective Symptoms

Flicker during flight was reported as a problem for one-fourth of the 102 helicopter pilots in the study. Generally, Dr. Johnson states, this was a minor problem and flicker was described as only annoying or distracting but in one instance a near-accident was attributed to flicker. Here is an excerpt from Dr. Johnson's report:

> *Problems with flicker during flight:* Twenty-five of the pilots reported on the questionnaire that they had been bothered by flickering light but helicopter flight time appears to be a factor here. Only two of the new pilots reported that they had been bothered by flicker. The common complaint was that flicker was "annoying," "irritating" or "distracting." One pilot reported a near-accident because of flicker but no pilot reported that he had aborted because of flicker. Problems with flicker most often arose when the aircraft was heading into the afternoon sun or when the afternoon sun was behind the aircraft. One pilot reported that it was particularly noticeable "when hovering in late afternoon sun over the water at approximately 500 ft altitude." The impression of most pilots was that fatigue tended to increase the annoying quality of the flicker.
>
> Half of the pilots reporting a problem with flicker stated that the rotating anticollision beacon was also "irritating," "distracting" or "annoying." This was particularly true at night when flying in fog or under low clouds. Most pilots indicated they either turned the beacon off or put it on steady in these situations.

May Become Drowsy

Some persons subjected to repetitive flicker may become drowsy. Twenty-two of the pilots studied became drowsy or went into light sleep during flicker. Many of these pilots were unaware that they were going to sleep. Those who did realize what was happening indicated that they could not prevent it. Nine of them stated they felt themselves getting sleepy and could not stay awake. Two described the flicker effect as hypnotic. It is a safe assumption, Dr. Johnson states, that the EEG clearly reflected a state of lowered vigilance in these pilots, a condition of which 11 of them were unaware.

"It would thus seem that any discussion of flicker reaction in helicopter pilots," Dr. Johnson states, "should stress not only the problems of vertigo, distraction, nausea and the possible alterations of consciouness but also the possible hypnotic or (sleep-inducing) potentialities."

Actual Cases Rare

Although actual reports of instances of flicker-induced seizure and even of flicker vertigo are rare in naval aviation, pilots and crew should be aware of the potential problem. Commenting on the case described at the beginning of this article, the squadron commanding officer pointed out that the infrequency of such an occurrence reemphasizes the need for crewmen to be constantly on the alert for any unusual human behavior which might arise in flight or on the ground. This mishap, he recommended, should receive Navy-wide dissemination. It shows once again the importance of the unknown human element.

[4] Bureau of Medicine and Surgery Research Task MR 005.12-2304.

notes from your flight surgeon

Discards Boots

HAVING decided ahead of time to discard his flight boots if he ever found himself facing a water survival situation, one NFO did just that after ejecting from an F-4. While descending in his parachute he looked at his watch several times and later estimated the trip down took about 12 minutes. After he was certain that he was getting low, he inflated his raft and life vest. Finally, at around 100 to 150 ft, he broke out of the overcast and was shocked to see land below him with no sign of even a beach.

After touching down and discarding his parachute, he observed two people about a half-mile away and his pilot a quarter of a mile away. He cut his raft off, picked up everything else around him which would give away his position, went to a small mound and tried to conceal himself.

The NFO monitored the pilot's transmissions on his survival radio. Five minutes later an Army helicopter which just happened to be in the area came by. The pilot fired two tracers and was picked up; the NFO was picked up immediately afterwards.

"With just one exception – the jettisoning of flight boots – survival equipment and procedures functioned as designed," the investigating flight surgeon reported. "That one variation points up the constant need for review even on apparently obvious and basic matters."

Happiness is *not* escape and evasion in-country if you are barefooted.

Nomex

F-4J RIO: I felt a violent explosion followed rapidly by a second explosion. I looked forward and right while reaching for the face curtain and saw a bright orange fire ball and fire which appeared to be inside and out of the cockpit. It became very hot in the cockpit and the airplane felt as though it were being tossed about like a toy. It appeared to be going high nose up and rolling to the left. I heard nothing over my headset from the time of the first explosion until time of ejection. The time span was 1 to 2 seconds or as long as it takes to reach the face curtain and pull.

Investigating flight surgeon: The fact that the RIO was able to escape with no burns despite being engulfed in flames is another testimony to the nomex flight suit's fire-retardant capability.

Clockwork

"I FELT that the deep water survival training which I recently completed helped me tremendously. The only thing that surprised me was that, although this was my first ejection, it was like I had done it a hundred times. It went like clockwork."

F-8 pilot

Whap!

ON A routine mission in RVN, a UH-1E lost power and autorotated down to the jungle. The cockpit was immediately secured and the crew left the aircraft. They contacted escort aircraft by radio and another *Huey* arrived 20 minutes later to hoist them with a sling improvised from a gunner's belt.

"When being hoisted," the copilot reports, "my head hit the skid. Had it not been for my APH-6 flight helmet, I might have been knocked unconscious."

Crowd Control

THE MAIN concern of the medical department in this event was the number of people in close vicinity of the burning aircraft. The crash crew and fire department did an excellent job in handling the aircraft. The crash took place on a nonwork day at this air station and only a few people were aboard. Had this happened on a weekend with selected reserves on board, the number of spectators would have been high.

The basic point is that a burning aircraft can have a secondary explosion and this could have resulted in a disaster. Crowd control will be further emphasized in future aviation safety meetings.

Flight surgeon in MOR

Cutaway

AFTER entering the water a pilot who had made a successful low altitude ejection had trouble locating his raft. While looking for it, he opened the survival gear pack allowing the items to spill into the water. He then located his raft, inflated it and climbed aboard. During this time he had become partially entangled in the line connecting the survival gear. He

used his survival knife to "cut three or four lines" of the survival gear. After discarding the desalting still, he began looking for the survival radio which he was unable to find. The pilot states that he identified each item before cutting it free. Since all the gear in the survival pack is attached by one common line, the investigating flight surgeon states, the possibility cannot be overlooked that the radio was inadvertently cut free at this time.

"By cutting the line connecting the survival gear," the flight surgeon reports, "the pilot completely defeated the purpose of the line. It is the opinion of this flight surgeon that pilots should not discard *any* of their survival gear until the rescue is actually in progress. It is absolutely essential that each naval aviator know current survival techniques and follow them as best he can. One's survival gear may prove to be equally as important just off the coast of Florida as it is off the coast of Vietnam."

Scuba and Dunker

SCUBA diving experience and Dilbert Dunker training enabled the pilot to keep his wits about him and escape when his P-3A impacted the water and sank. He remembers bright lights like stars, then a spinning sensation and then the feeling that he was sinking rapidly, possibly even upside down. He released his seat belt and tried to push free of the seat but his shoulder straps caught on something. The thought flashed through his mind, "No water is going to get me!" and he managed to get loose and ascend. He believes he was about 60 ft below the surface.

The investigating flight surgeon summed it up: "The survivor's successful escape and egress from a precarious situation while sinking rapidly was due to levelheadedness gained from his Dilbert Dunker training and his scuba diving hobby."

Night Rescue

PREVIOUS training paid off as the pilot of a UH-2C made his first night rescue, in fog and haze and with inoperative doppler equipment. Neither the hoist operator nor the swimmer had ever taken part in an actual rescue before. (The copilot's experience is not mentioned in the rescue report.) "There has to be a first time for everything and in this case," the copilot states, "the relatively junior crewmen performed like seasoned veterans."

The actual pickup of the two injured survivors took place, the pilot says, "with textbook precision." He credits training for the quality of individual performance and the smooth coordination of the total pilot/aircrew effort in this rescue.

"Night rescue techniques had been frequently discussed among pilots and crewmen," he reports, "both as a topic in formal meetings and as part of crew briefings. I feel these regular discussions gave increased awareness and appreciation of the problems, brought out various viewpoints on the best procedures and instilled confidence, particularly among the junior crewmen who did not have the benefit of extensive experience. The hoist operator had been designated as an aircrewman for less than one month and the rescue swimmer was still under training. Neither had previously participated in an actual rescue. The performance of the crewmen in this rescue was no less than outstanding."

The copilot in this rescue states that the items of survival gear which most aided in location of the survivors in their rafts were the Mk-13 Mod 0 night flare they fired, their one-cell flashlights which they were waving and the reflective tape on their helmets. (One of the survivors had failed to carry the required strobe light; the other had his but was injured and in mild shock and did not remember to use it.) One of them also had reflective tape on his mae west across his shoulders. This, the copilot reports, was also beneficial. ◄

PILOT TO NAVIGATOR,...
YES?
WHERE THE HECK ARE WE?
45° NORTH, AND 75° WEST!
HMMM... THAT SHOULD DITCH US SOMEWHERE BETWEEN WINNEMUCCA, NEVADA, AND THE GUGGENHEIM MUSEUM.

There once was a pilot named Brown
Who was known the whole world around
He thought he was free
To launch o'er the sea
'Til his tie-down refused to give ground
Remove All Tiedowns!

HELICOPTER deck handling procedures have not changed significantly over the years. There has been some refinement but basically the same methods developed to handle the HO3s, HTLs and HUPs still apply with the present generation of H-1s, H-2s, H-3s and H-46s. Helicopters are now chocked and secured with either three-point or six-point tie-downs when on the deck because of earlier lessons learned the hard way; that these birds upset mighty easily. The number of tie-downs put on a helicopter when it lands is determined by winds and sea state and whether there are intentions to fly it again soon. Even a helicopter which does not shut down after landing is chocked and tied down – at least momentarily.

Helicopters under most conditions are difficult to handle on the deck. Their high cg and far reaching rotor blades just naturally attract damage. Ashore, where space is usually not at a premium, ground handling is rather straight forward but aboard ship helo deck operations become especially sticky. Detailed deck handling and launching procedures have been developed. The CVA/CVS NATOPS manual is the source for the best operating instructions available for helicopter operators aboard ship. The instructions and warnings concerning tie-downs are carefully and plainly worded. Yet, despite all of these "goodies," despite reams of written word and despite the best efforts of safety experts helicopter pilots still attempt to takeoff with tie-downs attached.

In the helicopter community, perhaps more so than anywhere else, there exists a golden opportunity to increase readiness through safety. Seldom have more people been in a position to do more good than right now. How? By eliminating accidents which can easily be prevented such as attempting takeoffs with tie-downs attached. In the last three years there were 32 such accidents. Note the numbers, by model, in Fig. 1 below.

As is evident from the statistics shown in Fig. 1, no particular model is any more susceptible to this occurrence than any other. If anyone wonders what these statistics represent, they mean that a 12 percent reduction in helicopter accidents could have been brought about if pilots and ground/deck crews had

Takeoffs with Tiedowns Attached
FY-66 through FY-68

UH-1	2	UH-34	8
UH-2	7	CH-46	7
SH-3	7	CH-53	1

Fig. 1

ensured that tie-downs had been removed prior to liftoff. *Twelve percent.* What a tremendous improvement that would have been!

The following case is typical. The SH-3A was tied down on spot No. 5 of a CVS and was scheduled for a 2200 plane guard flight. (Photo below shows the deck location where it was spotted.) The crew reached the plane and began a routine preflight. The exterior inspection was split between the pilots. The HAC, who was going to sit in the left-hand seat, inspected the port side. The copilot, who was going to fly from the right seat, inspected the starboard side. The second crewman also assisted in the exterior inspection and no discrepancies were found. After the crew had strapped in and were ready to launch the signal was given by the plane director to hold brakes, remove chocks and tie-downs and stand clear of the helicopter. Each pilot observed the removal of chocks and tie-downs on his side of the plane and reported this fact to the other. After receiving the signal to launch the pilot in the right seat (copilot) attempted takeoff. One tie-down (under the plane, attached to the inboard side of the left MLG and out of sight in the dark) had not been removed. The helicopter upset to the left, skidded left over the side

and crashed. Fortunately, all hands escaped and were picked up in about 20 minutes by a motor whaleboat from an accompanying DD.

The helicopter had landed about an hour and a half before the ill-fated takeoff attempt. In accordance with ship and squadron SOP it was shut down and secured with a six-point tie-down and then postflighted. One of the deck crew had trouble attaching the second tie-down on the port side and had finally found a tie-down point by raising the personnel door and reaching inboard and forward. This is the tie-down that was not removed prior to flight. The deck crewman who had secured the port tie-downs after the earlier landing also helped during the

last launch of the helicopter but he did not know that the man on the port side (away from any lights) had only removed one tie-down. (Photo above shows where it was attached.) *The HAC, the flight crewman, the man assigned to the port MLG and the plane director all inspected the helicopter but no one noticed the tie-down under the helicopter, thus the takeoff was attempted with it still attached.*

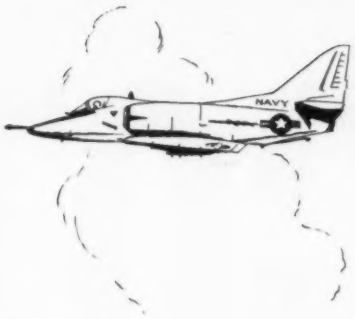
This accident happened to be a night accident and the fact that no one used a flashlight to illuminate the dark area could easily have been an important contributing factor. However, takeoffs with tie-downs still attached have happened just as often in the daylight as in the dark. The CVA/CVS NATOPS manual specifies four evolutions concerning removal of tie-downs prior to launch. First, is that approximately one minute before launch the Air Boss will order tie-downs removed. The LSE then signals for removal of tie-downs ensuring that the pilot sees the signal. Next, the plane handler removes the tie-downs for the pilot and LSE to see. One final procedure remains – the LSE is charged with the responsibility of ensuring all tie-downs have been removed before he gives the pilot the launch signal. The moral is plain: know and follow the procedures step by step. Remove all tie-downs!

The Miss-placed Hat

By LCDR R. J. Sinwell

DAVE'S wife was very pleased with his new commander's hat. She had bought it the day the promotion list came out, along with a new chin strap, a new eagle, shield and anchor device. To Dave the hat was heavy and uncomfortable but as operations officer he would try to set a good example, so he wore it, but with reluctance. In a few hours his hat would help kill him.

Filing his flight plan to NAS Desert Rock, Dave was his usual meticulous self. He checked everything thoroughly. Enroute weather to the mountains was clear but beyond there was a low cloud layer. His destination reported 3500 ft overcast and 15 miles visibility, with tops at 12,000 ft. Desert Rock tacan was out of service. Bearing and distance from Bingo City to Desert Rock was computed at 120 degrees, 63 miles and was put on his navigation card. The total estimated time enroute was 30 minutes.



After a thorough walkaround of his A-4, Dave helped the plane captain stow the hell-hole bag, which was barely big enough for a uniform, civilian clothes and a shaving kit. No room for a hat in there so he put it in the cockpit on the glare shield next to the standby compass.

Airborne, Dave skirted the slopes of the mountains enjoying the scenery, unconcerned with navigation as he had made this trip many times before. His thoughts wandered to his squadron's upcoming deployment to NAS Desert Rock. This afternoon he would make the advance arrangements for target times, bombs and rockets, berthing and BOQ rooms, office and hangar space.

Passing a ski resort he started a climb and leveled at 15,500 ft. Dave headed 020 degrees after aligning his gyro compass with the standby compass. A 40-degree correction indicated trouble in the slaving mechanism. Switching to the free position, he noted the discrepancy on his kneeboard.

He thought he could complete the liaison details by five, have dinner and watch "Laugh-In" in the club bar. After dialing in the frequency of Desert Rock's UHF beacon, he wondered what Goldie would say about his sick UHF homer. Probably, "Give it two aspirin and a lot of rest." Well, that's what it had been getting all right, lots of rest, for it apparently hadn't been checked in a long time. The No. 1 needle was spinning, not homing to NAS Desert Rock. Another note went on the kneeboard.

He was getting good bearing and distance information from Bingo City vortac, though. His present heading should put him 63 miles on the 120-degree radial, right over the air station. He called the tower for weather. It was still the same: 3500 ft overcast, 15 miles visibility. He descended to 12,500 ft, just skimming above the overcast. There wasn't a hole anywhere; it was solid and there was no radar at Desert Rock.

He remembered how early flyers would find their way home when it was overcast. Tethered balloons were sent aloft to mark the airfields and pilots would either circle through the clouds or descend on a prescribed heading. Why couldn't he do something similar, using his tacan set?

With field elevation at 4000 ft and the ceiling at 3500 ft, that meant the overcast was from 7500 to 12,000 ft, only 5000 ft thick. Descending at 5000 ft per minute the penetration should only take about one minute and cover less than five miles at 250 kts. Desert Rock valley was at least 30 miles wide, so there was plenty of room for navigation error. A collision with another aircraft was a slight possibility, but he was well clear of airways. Dave only had to be sure he was over the valley.

He checked his gages, flight and engine instruments were normal, gyro and standby compasses agreed. The decision to descend was made when he turned on the anti-ice switch. The mileage was coming up on 65 and as the bearing passed 125 degrees, he started a left turn, popped the speed brakes, reduced power and started down through the clouds.

The next morning the search planes located the wreckage on a mountain 160 degrees, 63 miles from Bingo City.

The Accident Board reported that the small amount of metal in the commander's hat created an error in the magnetic standby compass. This, coupled with a 40-degree lock-on error in the aircraft's tacan, caused the pilot to believe he was over NAS Desert Rock when he was, in fact, 40 miles away and over mountainous terrain. ◄

'GOTCHA!'

LIKE the outstanding golfer who spent most of the game waiting for the second "Gotcha," maintenance men should regard certain aircraft maintenance situations with equal wariness.

Today's complex aircraft have a variety of movable, powered devices and accessories. High pressure hydraulics are often used to open and close canopies, speed brakes, spoilers and flaps. Other devices may be powered by air or electricity but, however they are powered, many of these devices represent a potential personnel hazard during ground operations. These hazards are well illustrated by accident and incident reports which have been received by the NavSafeCen:

- A maintenance man was performing unscheduled maintenance on a TAF-9J. Upon completion of his work he started to exit the aircraft. As he did so he accidentally moved the canopy actuating handle with his knee, causing the canopy to close. The maintenance man's head was caught between the canopy and windscreen. Other personnel working nearby, seeing his plight, opened the canopy; however, the maintenance man suffered severe injuries which included multiple jaw fractures.

- An aviation electrician was working on the center pedestal of an A-6B. In so doing he positioned himself in such a manner that his left leg was sticking out the side through the canopy opening. Other personnel working on the aircraft announced that they were applying hydraulic power to the aircraft and warned the electrician to check the canopy selector handle to the open position.

About 5 minutes after hydraulic pressure was applied personnel working outside the aircraft noted the canopy to move toward the closed position. A warning was shouted and hydraulic pressure was cut off but the canopy continued to close, pinning the electrician's leg. Serious injury was only narrowly averted. Investigation disclosed that the electrician, while working on the

center pedestal, had unknowingly actuated the canopy selector handle.

• An A-6A was positioned for a routine post inspection engine turnup. The cockpit was manned by two maintenance men to start the aircraft and a third man was standing on the aircraft boarding ladder, leaning into the cockpit. As the port engine was started the canopy began to close. The man standing on the ladder was pinned between the canopy and the rail before the canopy selector valve could be repositioned. The canopy was quickly opened and the engine secured. Nevertheless, the man was hospitalized for observation because of possible internal injuries.

• A CH-46D helicopter was making a landing in a forward area. Just as the cargo ramp was opened the helicopter began to shift. The crew chief stuck his head out of the opening between the fuselage and the ramp in order to clear the area for the pilot. As he did so the ramp started to close, pinning his head between the ramp and the fuselage. Other personnel opened the ramp immediately, freeing the crew chief. Miraculously, he suffered only minor injuries.

• Six men were engaged in refueling an F-4B. As the aircraft was directed into the pits, stopped and the pilot given the shutdown signal, men began to connect the refueling hose grounding wires and the electrical power cable. The pilot was engaged in securing the cockpit and did not immediately shut down after the signal. Unknown to the pilot and unseen by the crew, a plane captain under training prematurely began to preoil the aircraft through the aux air doors. The pilot then secured the engines. As the generators went off the line the aux air doors slammed shut on the man's right forearm. The preoiler connector prevented the door from completely shutting. The rest of the pit crew began to pull on the door and as the hydraulic pressure bled off the door slowly opened. The man was hospitalized and treated for severe bruises, minor cuts and possible tendon and ligament displacement.

The design of these doors is such that they have the characteristics of slamming shut when electrical power is lost.

• An F-8A was started normally and the signal was given to disconnect external power. At this time the pilot selected electrical power to OFF in accordance with NATOPS but did not immediately select aircraft power. Meanwhile, maintenance personnel had moved to the starboard wheelwell to check the fuel boost pumps. The plane captain inadvertently placed his hand in the speed brake area with the speed brake slightly open (normal when aircraft is without power). The pilot selected electrical power, the speed brake closed pinning the plane captain's hand. The pilot was immediately informed of the situation and cracked the speed brake by selecting the speed brake override, raising the wing and activating the speed brake down. Luckily, the plane captain suffered only minor contusions and abrasions.

The investigation brought out the fact that the pilot was not completely aware of the capabilities of the systems in the aircraft. His reaction, as stated, was to select the override switch to actuate the speed brake. When this did not work he raised the wing and at this time was able to crack the speed brake. The reporting officer noted that it is much quicker to crack the speed brake by merely turning the electrical power OFF. He concluded by saying that, although this is a rare incident, personnel should be briefed on the possibility and be aware of the quickest and easiest method of handling the situation.

Forewarned Is Forearmed

Many precautions are suggested by these accidents. All such operations should be adequately supervised and performed by maintenance personnel who have sufficient knowledge of the aircraft and its systems to recognize dangerous situations. The most obvious lesson to be learned from these incidents, however, is that in aircraft operations on the ground or in the air, there is no place for inattention or complacency. ◄

Let there be light!

A Simple Way to Improve Lighting in Aircraft Maintenance and Assembly Areas

By J. Maccioli and H. Worsham

OVER the years there have been repeated complaints of inadequate illumination for work in aircraft maintenance and assembly areas. Recent reports on this subject come from such sources as Aviation Safety Council Meetings, the Naval Ship Research and Development Center, Occupational Health Releases (Bureau of Medicine and Surgery) and Naval Safety Center facilities surveys. One of the most serious problems is in getting sufficient illumination to the underside of aircraft. Instances are reported where illumination levels of near 20 foot-candles strike the deck but *less than one* foot-candle is reflected to the aircraft undersurfaces. The use of a highly reflective deck coverings can greatly enhance the illumination of these areas.

Adequate lighting in aircraft assembly and maintenance areas is necessary to ensure safety and error-free maintenance as well as to increase efficiency and comfort, especially when working on the underside of the aircraft. The ideal level of illumination recommended for assembly, inspection and repair areas is 100 foot-candles (Illuminating Engineering Society Lighting Handbook, 1966). For rough assembly work a level of 30-50 foot-candles is recommended. Many areas are provided with only a fraction of this amount of illumination. NavShips 250-560-4 (Lighting of Ships) notes a requirement of seven foot-candles (minimum) for ships' hangar spaces, due to other practical limitations. Even with the recommended ideal levels, and particularly where there are lesser levels, the illumination needs to be reflected into the work areas, namely, onto the underside of aircraft. Application of the reflective deck principle can be a considerable aid to the seeing task as shown in the following experiment:

A highly reflective white paint was applied to the deck of a hangar area at Naval Air Rework Facility, Norfolk, to reflect the available illumination from overhead luminaries (mercury-vapor lamps plus auxiliary quartz iodine filament lamps) onto the underside surfaces of aircraft. This has substantially alleviated the dark conditions under which maintenance and assembly personnel had frequently worked. Many efforts were formerly made to improve the illumination by the use of deck fixtures which shine the light upward. These efforts failed due to light blinding, glare and shadow problems. The improvement in illumination of the underside of aircraft, after painting the deck under and immediately surrounding the aircraft, is shown in the "before and after" night photographs to the right.

For those who may conjecture that the comparison is trick photography, the photographer took great pains to use the same lens opening, same exposure time, same distance and the same printing technique for all the photographs. The difference noted in Figures 1 and 2 is mainly due to camera direction. In Figure 1 the photo was taken looking away from the central lighted areas (here there was *some* help from reflections off a painted deck area nearby). The apparent dramatic improvent of visibility in Figures 3 and 4 was subjectively confirmed by supervisors, workmen and the authors. The latter two made illumination measurements during night shift work and encouraged further extension of this principle.

A typical measurement made after painting the deck under and surrounding the aircraft with the highly reflective white paint showed the following levels:

	Foot-Candles
Level on deck	30
Level reflected from the deck	23
Level at aircraft underside surfaces (fuselage & wing)	5-8

As seen from the foregoing, about 80 percent of the illumination was reflected from the deck surface to give a fair illumination level to the undersurface. This is quite a contrast to the *less-than-one-foot-candle* found under the fuselage in the case of unpainted and soiled concrete deck in the same general area. Even a painted area which had been soiled for several weeks continued to show these beneficial results.

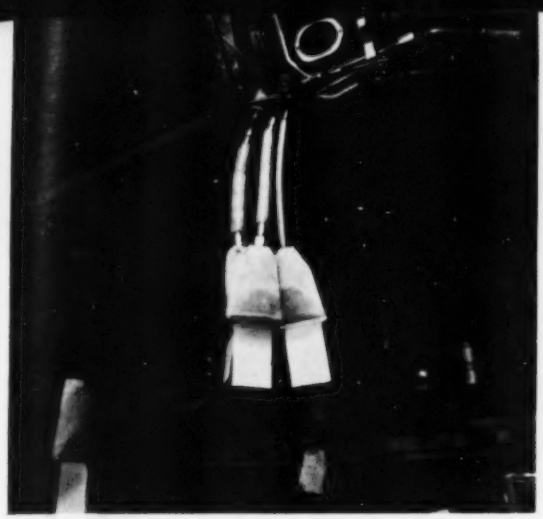


Fig. 1 BEFORE painting deck white.

Fig. 2 BEFORE painting deck white.

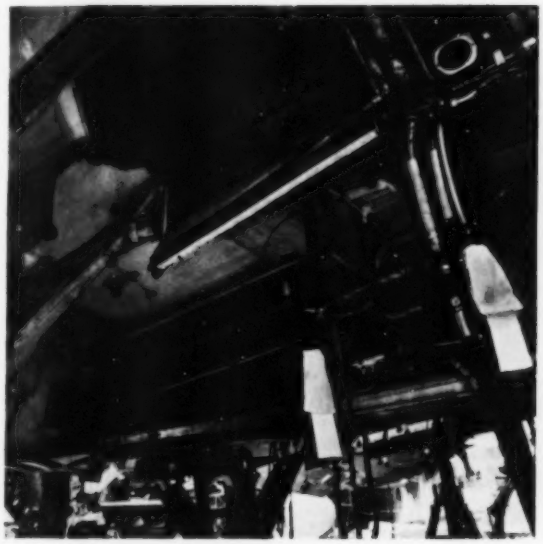


Fig. 3 AFTER painting deck white.

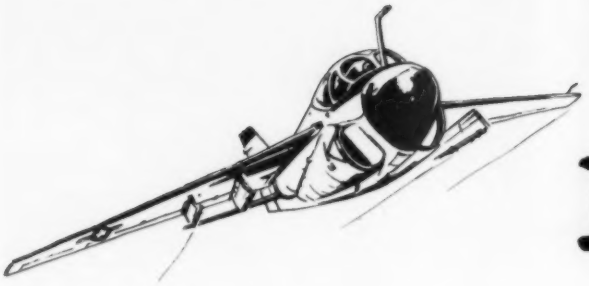
Fig. 4 AFTER painting deck white.

	Foot-Candles
Level on the deck	28
Level reflected from the deck	17
Level under wing	7
Level under fuselage	3

In addition to the beneficial effect shown by the illumination measurements, workers and supervisors subjectively indicated a dramatic improvement in the visual environment (much easier to see and more comfortable). The entire hangar deck area used for aircraft spotting has subsequently been painted. Marked improvement in quality and quantity of production has been noted at this facility.

The deck paint used was "Tylon High-Hiding" white enamel (manufactured by the Baltimore Paint Co.). This was mixed in a ratio of 4:1 with epoxy resin concrete sealer. This is not a fire retardant paint. However, fire-retardant white paints which have high reflective values are available commercially. Paint procured under military specification Mil-E-17970C is a fire-retardant paint described as follows: Enamel, nonflaming, chlorinated-alkyd resin, soft-white semigloss, formula 124/58, reflectance value approximately 80 percent.

The foregoing method is being investigated further by NavAir and if evaluation reports are also favorable, technical guidance will be forthcoming from NavMat. – Ed.



Letters

Temper gets you into trouble, pride keeps you there.

Anon.

Sweeping Indictment

FPO New York – Your April edition contained an article titled, "A Real Approach to FOD Prevention." The emphasis placed on a good, sound FOD prevention program cannot be overstressed.

In your article you indicate the inability of a jet engine to vacuum objects from operating surfaces unassisted and that prevention of pea gravel damage is almost impossible. You proved through tests that a J57 would not suck up foreign objects unassisted. On the present deployment there have been three cases of people finding themselves inside of intakes. They may have been assisted, but little was actually required. Why reduce their respect for intakes and degrade the importance of good housekeeping?

Additionally, the adjective "impossible" which you used with pea gravel damage is seldom used in naval correspondence. Though it may be impossible to alleviate the pea gravel damage, why tell people – it will only discourage them from combatting FOD.

To summarize: You have arrived at eight conclusions, none of which are of value to fleet personnel. If anything, the value of a good sound FOD program has been deteriorated through discouragement.

LT R. K. Koehler
VA-72

● It appears that you may have missed the point of the article which in its introductory subhead addressed the subject of runway sweeping.

For several years most FOD prevention efforts have been addressed to hardware and people ingestion. While these efforts were not misdirected there has been a misunderstanding as to the effects of pea gravel and how it can be controlled more effectively. Hence, the analysis of runway/ramp sweeping efforts at this point.

CNO msg 112325Z of April 1969 mentions the subject article but in an entirely different light. We were pleased to hear from you as well as CNO (we can tell who's reading the magazine) and we are especially delighted that we have been able to publicize a most necessary study of FOD prevention.

FOD Prevention Help

APO New York – We find the article, "A Real Approach to FOD Prevention," in the April issue an outstanding piece of work. Request 10 additional copies of this issue. These are needed in support of our base FOD Prevention Program.

Capt T. R. Albritton, USAF
Wing Flying Safety Officer
401 Tactical Fighter Wing (USAF)

● Glad to be of service. Your copies are underway.

Survival Items

FPO, San Francisco – Here's a list of survival items which I recommend that helicopter crews carry in addition to the SEEK-1 and SEEK-2 kits. I've had several combat tours to work this out – maybe it will be helpful to others.

Beef jerky, dried fruit such as peaches, apricots and raisins

Plastic hip flask or baby bottle of water

Slingshot with ball bearing ammo and extra sling

Surgical tubing (2 ft) for tourniquet or extra sling

Chamois for washcloth or water strainer

Multipurpose pocket knife

Pen light

Butane lighter

Shroudline (minimum of 20 ft)

Cigarettes or chewing tobacco – chew either to make tobacco juice for tick and leech removal.

Helicopter Pilot

● We can't argue with experience – just don't hang the survival equipment on until you approach the teddy-bear configuration. APPROACH and *Crossfeed* will keep readers informed on this vital subject as new developments take place.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

Pointy Horns

Washington, D. C. – I read with interest the excellent article on the "Dead Man's Curve," by LCDR Gilstrap in the May issue of APPROACH. As a test pilot who has been around the curve in more than eight different helicopters under critical conditions of power, gross weight and density altitude, I would like to offer the following comments:

On most single engine helicopters, the low speed curve (the one usually shown from zero airspeed to 30-60 kts and extending in height from in-ground-effect hover to 500-1000 ft) represents the most that a practical highly skilled test pilot can realize under

critical conditions. After engine failure from a point on this curve a normal autorotative glide is not often realized prior to touchdown. From the lower half of the curve, the collective pitch control may never reach bottom, because if it does, the sink rate will build up to something you can't stop. From many points flare is ineffective because forward speed and rotor decay have already taken their toll. Each point on the curve becomes a different set of very closely timed and coordinated reactions which results from a series of gradually approached conditions. Even under these conditions, the accident rate for height-velocity diagram development and demonstration would raise your brows up under your hat.

The high speed, lower level curve usually presents less of a problem if you're over a prepared surface. If not, be prepared to have a truck pick up the small pieces – there won't be any big ones.

If you must operate close to, or within, these curves, don't stack the deck against yourself by combining all the critical conditions. If you have to hover high for a hoist or sling load, plan your fuel load for the lightest gross weight possible, and even a little wind does wonders if you know its direction and hover directly into it. Don't operate at high power near the never-exceed-speed for your density altitude with low RPM. I've seen H-34 types try to cross the mountains at 90 kts, 7000 ft and 33 in HG with 2300 rpm. That's asking for it.

The comment about slamming the collective down causing problems can also be applied to all the controls. Sudden cyclic inputs during the rotor decay following engine failure can drive the blades through your machine, too.

Some single rotor machines exhibit marked pitch changes after engine failure at high speeds and there may be a natural corrective reaction. It has been my experience that an immediate, but smooth, response on all the controls works satisfactorily with all I've tested so far.

Don't expect an approach following a surprise engine failure to look just like the autorotation you practiced, because it won't. The fact that you can enter a practice autorotation and execute a 180 degree turn and landing from 500 ft doesn't prove that cruising downwind at that altitude is safe. After an engine failure with its built-in delay factors, it will take 200 ft or more altitude than you thought.

Don't tighten the collective friction to the degree that the control is difficult to move. In many helicopters, an engine failure will cause the loss of one control system power and may make its movement even more difficult. Obvious, yes, but I've seen pilots commit this error over and over.

In short, stay away from these critical conditions when you can, and when you can't, bend everything under your control in your favor. Every pilot owes this much to his fellow crewman, and the taxpayers.

CDR D. A. Tuck
U.S. Naval Weapons Quality Assurance Office

• Thank you for your kind remarks about LCDR Gilstrap's article, "Pointy Horns," in the May issue and for your excellent comments which should be of interest to all helicopter pilots.

In order to keep this subject alive we plan to run the first of a series of articles by various contractors in the August issue. Keep your eyes open for "Autorotation" by Mr. LaVassar of Vertol.

Pointy Horns Passion

USCG Air Station Detroit – I read each and every APPROACH Magazine with an extreme passion. But, since I am a helicopter pilot, your articles concerning this unique machine attract most of my attention. So, when I came upon the article "Pointy Horns" in the May issue, I smiled and immediately became engrossed. I read it twice, not because of its content, but because of its lack of content. If there was any beneficial info in it, I know it could have been condensed to one column. To waste two full pages is indeed a crime. To think that hundreds of other pilots wasted their time reading it is an even greater offense.

E. E. Demuzzio
LT USCG

• Thank you for your letter, we are pleased to learn that you are an avid reader of APPROACH.

Naturally, we are sorry that the article, "Pointy Horns," disappointed you. It was written in a humorous vein with the intent to review, in general, the conditions requiring autorotation but specifically to call attention to the "controlled" conditions under which any contractor develops the H-V diagram for a specific model. It also draws attention to the time involved in the event of power failures, considering attitude and airspeed of the helo, and to point out that real problems exist in the high speed regime.

We have received some articles from various contractors on specific models and have been promised others. Please see the answer to CDR Tuck's letter on this same page.

How's That?

Washington, D. C. – What is a "kudo"? (APPROACH, May 1969, p. 46)

H. M. Fitzpatrick
Office of Naval Research

• A misspelled word. ◄

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Vol. 15 **approach** No. 1

RADM Roger W. Mehle
Commander, Naval Safety Center

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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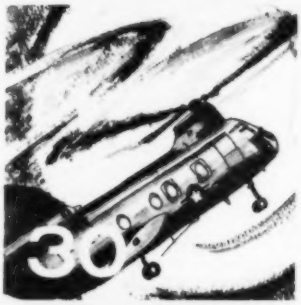

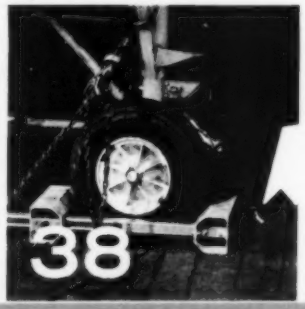

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Next Month

Hard Landings
How They Happen

CAPT William A. Kiernan, Director of Aviation Safety Programs

CDR C. F. Clark, Editor
LT W. T. T. Hood Jr., Managing Editor
Robert Trotter, Art Director
J. C. Kiriluk, Maintenance Editor
J. A. Bristow, Life Sciences Editor
W. E. Cumbie, Military Editor
C. B. Weisiger, Helicopter Editor
Blake Rader, Illustrator
PHC Harry Culbertson, Photographer

Credits

This month's cover painting by R. G. Smith rings a note of nostalgia as the legendary SBD's sweep out of the past for another curtain call. Courtesy McDonnell-Douglas, St. Louis, Mo. **IFC-Pg 1** Art by Walter Dey of Grumman NATOPS, Grumman Aircraft Engineering Corp., Bethpage, L. I. **Pg 37** 'B.C.' by Johhny Hart, by permission of Johnny Hart and Field Enterprises, Inc.

IN MEMORIAM

JOHN CHARLES KIRILUK

24 November 1916 – 2 June 1969

Mr. John C. Kiriluk, Maintenance Editor of APPROACH and MECH Magazines, died 2 June 1969. He was one of the first civilian writer/editors of APPROACH, hired in 1955 upon his retirement after 20 years active duty in the Navy.

He was born in Barberton, Ohio on 24 November 1916 and entered the Navy in September 1935. His duty stations included USS OKLAHOMA; NAAS Corry Field; NAS Miami; HedRon-11, Dutch Guiana; VR-9, Olathe; VR-3, Pax River; VR-4, Moffett; VP-4, Whidbey Island; FASRon-102, Norfolk; USS MINDORO; FASRon-3, Norfolk; NAS Norfolk; USS CORAL SEA and Naval Safety Center. He retired as Chief Aviation Machinist Mate in April 1955 and entered civil service that same month.

Mr. Kiriluk attended the Norfolk Division of William and Mary, now Old Dominion College. He was a graduate of the Armed Forces Information School, Carlisle, Pa.; the USAF Aircraft Line Maintenance School, Keesler Air Force Base, Miss. and the Aircraft Engine Maintenance Course, Pratt and Whitney, Hartford, Conn.

Mr. Kiriluk, long the champion of the aviation enlisted man, began his literary career while still on active duty. He was the editor of the FASRon-3 newspaper, the NAS Norfolk *Dope Sheet* and the USS CORAL SEA newspaper. After retirement he continued his literary efforts as the Maintenance Editor of APPROACH and MECH, and more than any other individual was responsible for MECH becoming a quarterly publication. Mr. Kiriluk is best known for his adaptation of "Murphy's Law" to naval aviation (If an aircraft part can be installed incorrectly, someone will do it). This became a monthly feature of APPROACH and received wide recognition throughout the aviation industry.

Mr. Kiriluk received many awards for his excellence in writing. Under his editorship the *Dope Sheet* earned the first place award by the Armed Forces Press Service and the Certificate of Merit, Department of Defense Newspaper Award. During his career as Maintenance Editor of APPROACH the magazine has received numerous Chief of Naval Information merit awards.

Mr. Kiriluk was active in many civic organizations. He participated locally and nationally for years in the Soap Box Derby. He was a booster of the Norfolk Neptunes (pro football team) and the Northside Athletic Assocation.

Naval aviation has suffered a great loss in the passing of this talented man but his contributions to aviation safety will live on.

Experience isn't the best teacher, if you can't use it.

Anon.